

SEQUENCE LISTING

<110> SYKES, KATHRYN F.
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<120> METHODS AND COMPOSITIONS FOR VACCINATION COMPRISING
NUCLEIC ACID AND/OR POLYPEPTIDE SEQUENCES OF THE GENUS
BORRELIA

<130> MCRO:003US

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<141> 2003-10-17

<150> 60/419,401

<151> 2002-10-18

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<170> PatentIn Ver. 2.1

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<213> *Borrelia burgdorferi*

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His Ser Lys Asp Ile Ser Asn Leu Arg Thr Leu Asn Asp Ser Leu Ser
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Gln Glu Leu Ala Arg Leu Lys Ser Asn Leu Asn Asn Glu Gly Met Phe
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 65 70 75 80
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 Lys Val Glu Arg Asp Ile Lys Leu Ile Glu Leu Tyr Ser Lys Tyr Asn
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 35 40 45
 Tyr Gly Leu Ser Lys Glu Tyr Glu Leu Val Pro Ser Ser Glu Ser Val
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 35 40 45
 Phe Glu Lys Met Gly Tyr Asn Ala Glu Ile Phe Ser Val Thr Thr Ser
 50 55 60
 Ile Met Tyr Gln Tyr Leu Ala Ser Gly Lys Ile Asp Gly Thr Val Ser
 65 70 75 80
 Ser Trp Val Pro Thr Ala Asp Lys Phe Tyr Tyr Glu Lys Leu Lys Thr
 85 90 95
 Lys Phe Val Asp Leu Gly Ala Asn Tyr Glu Gly Thr Ile Gln Gly Phe
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 Val Val Pro Ser Tyr Val Pro Ile Ser Ser Ile Ser Glu Leu Lys Gly
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 Gly Thr Gln Ile Val Thr Glu Gln Ala Leu Asn Tyr Tyr Gly Leu Ser

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Pro Asp Leu Ile Met Gly Gly Ile Glu Ser Val His Thr Leu Val Arg						
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 35 40 45
 Gly Phe Val Leu Arg Asp Phe Asp Asn Ser Ile Asp Ser Glu Lys Leu
 50 55 60
 Trp Phe Cys Ala Leu Glu Cys Leu Glu Ser Asn Gly Tyr Ile Asn Tyr
 65 70 75 80
 Glu Ile Thr Asn Phe Ala Leu Lys Gly His Glu Ser Arg His Asn Lys
 85 90 95
 Leu Asn Trp Glu Leu Lys Pro His Leu Gly Leu Gly Leu Tyr Ala Val
 100 105 110
 Ser Leu Leu Phe Cys Asn Asp Lys Asn Asn Asn Val Arg Ala Leu Ile
 115 120 125
 Arg Lys Thr Gly Ser Phe Val Lys Ala Asn Asn His Leu Val Thr Phe
 130 135 140
 Glu Leu Leu Glu Asp Leu Glu Phe Phe Val Tyr His Phe Ile Gln Gly
 145 150 155 160
 Leu Gly Thr Ile Gln Gly Val Ser Leu Arg Ala Leu Arg Leu Arg Phe
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 Leu Ser Lys Lys Phe Val Phe Asp Asp Asn Ile Met
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Glu Leu Lys Cys His Leu Ile Leu Leu Gly His Pro Ile Ile Lys Thr
35 40 45

Leu Tyr Ile Lys His Val Asp Phe Cys Leu Ser Arg Gln Asp Asn Leu
50 55 60

Lys Phe Ile Phe Thr Ser Leu Ser Lys Tyr Ile Asn Leu Glu Leu Leu
65 70 75 80

Glu Glu Phe Thr Leu Glu Ile Ile Pro Gly Tyr Val Asp Phe Glu Lys
85 90 95

Phe Lys Leu Leu Asp Glu Phe Cys Ile Thr Arg Ile Asn Leu Asn Val
100 105 110

Gln Ser Phe Ser Leu Glu Phe Arg Lys Ile Val Gly Ile Pro Glu Ile
115 120 125

Ser Tyr Lys Lys Leu Asn Ile Leu Ile Asn Asn Ile Arg Lys Phe Pro
130 135 140

Phe Asp Leu Asn Ile Asp Met Thr Val Asn Met Pro Leu Gln Lys Lys
145 150 155 160

Ser His Leu Lys Arg Asp Leu Lys Glu Leu Leu Ser Tyr Met Pro Glu
165 170 175

His Ile Cys Phe Ser Asp Phe Ile Cys Glu Glu Glu Gly Phe Val Leu
180 185 190

Arg Asp Phe Asp Asn Ser Ile Asp Ser Glu Lys Leu Trp Phe Cys Ala
195 200 205

Leu Glu Cys Leu Glu Ser Asn Gly Tyr Ile Asn Tyr Glu Ile Thr Asn
210 215 220

Phe Ala Leu Lys Gly His Glu Ser Arg His Asn Lys Leu Asn Trp Glu

25348199.1

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Ser Phe Val Lys Ala Asn Asn His Leu Val Thr Phe Glu Leu Leu Glu						
	275		280		285	
Asp Leu Glu Phe Phe Val Tyr His Phe Ile Gln Gly Leu Gly Thr Ile						
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Gln Gly Val Ser Leu Arg Ala Leu Arg Leu Arg Phe Glu Tyr Asn Glu						
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Lys Gln Phe Phe Gln Phe Ile Asn Tyr Cys Ser Thr Leu Ser Lys Lys						
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Phe Val Phe Asp Asp Asn Ile Met Leu Leu Lys Gly Arg Glu Arg Phe						
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Lys Leu Asn Phe Tyr Leu Val Lys Ile Ile Asn His Phe Asn Asp Asn						
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 Ile Lys Phe Pro Val Phe Asn Gly Gly Leu Phe Ser Glu Asp Lys Val
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 Lys Tyr Leu Asn Asn Glu Gly Leu Leu Ser Ile Ser Glu Ile Glu Glu
 100 105 110
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 115 120 125
 Lys Phe Val Lys Tyr Ser Arg Leu Asp Pro Lys Ser Phe Gly Glu Leu
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Leu Lys Asp Phe Phe Ile Leu Ile Lys Asn Lys Leu Phe Ser Ile Asp
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Asp Asn Ser Thr Glu Ala Asn Ile Glu Ser Leu Leu Lys Tyr Ile Phe
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Glu Glu Leu Asn Tyr Ser Val Glu Gln Gln Lys Ala Gly Gln Ile Glu
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Gly Val Glu Ser Arg Val Asp Ile Leu Leu Phe Glu Asn Asp Lys Asp
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Lys Ala Ser Phe Asn Asn Lys Leu Lys Glu Ala Lys Lys Asn Asn Glu
100 105 110

Pro Ile Pro Ile Glu Asp Ile Leu Ile Ile Ala Glu Val Lys Arg Pro
115 120 125

Thr Phe Ser Phe Asp Ala Lys Asp Lys Leu Lys Glu Ser Glu Asp Gln
130 135 140

Leu Tyr Arg Tyr Leu Asn Gln Tyr Gln Lys His Tyr Gly Ile Leu Ser
145 150 155 160

Asn Gly Lys Val Trp Arg Leu Tyr Asp Lys Ser Lys Val Leu Tyr Gly
165 170 175

Glu Lys Arg Tyr Ile Glu Phe Asn Phe Xaa Lys Ile Glu Glu Lys Glu
180 185 190

Glu Tyr Lys Glu Gln Glu Trp Phe Val Leu Phe Ile Tyr Leu Ile Arg
195 200 205

Lys Glu Arg Tyr Leu Lys Thr Ser Asn Val Ile Glu Val Glu Lys Glu
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Gln Ile Ala Lys Glu Lys Glu Ile Ile Gln Lys Thr Leu Lys Glu Ile
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Leu Tyr Glu Arg Pro Asp Asp Ser Ile Val Phe Lys Ile Ala Lys Asn
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Ile Tyr Asp Lys Glu Phe Lys Leu Ser Gly Lys Glu Ile Thr Gln His
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Ile Leu Ala Ser Ile Leu Glu Glu Ser Ile Ile Phe Ile Leu Arg Ile
275 280 285

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Phe Phe Ile Ala Tyr Ile Glu Asp Asn Asp Ile Phe Lys Lys Ile Leu
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Tyr Asp Glu Asn Thr Lys Lys Lys Leu Glu Tyr Lys Lys Ile Ile Thr
325 330 335
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340 345 350
Phe Asn Gly Gly Leu Phe Ser Glu Asp Lys Val Lys Tyr Leu Asn Asn
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Glu Gly Leu Leu Ser Ile Ser Glu Ile Glu Glu Ile Leu Val Lys Met
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Glu Tyr Asp Leu Arg Ile Ala Asp Thr Thr Val His Arg Ile Ile Glu
420 425 430
Asp Gly Val Tyr Leu Ile Arg Thr Glu Glu Glu Leu Glu Asn Lys Lys
435 440 445
Val Asn Lys Ile Ala Thr Tyr Leu Lys Gly Asn Ile Tyr Leu Thr Ser
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Arg Ser Leu Asp Arg Lys Lys Ser Gly Ala Tyr Tyr Thr Pro Asp Asp
465 470 475 480
Leu Thr Asp Phe Met Val Ile Ser Ser Ile Glu Glu Gln Leu Lys Thr
485 490 495
Lys Ser Pro Leu Asp Ile Lys Ile Ile Asp Asn Ser Cys Gly Ser Gly
500 505 510
His Phe Leu Ile Ser Cys Leu Asp Tyr Leu Thr Glu Lys Val Trp Tyr
515 520 525
Glu Leu Asp Lys Phe Glu Asp Val Lys Lys Glu Leu Asp Glu Glu Tyr
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Arg Val Ile Ile Glu Glu Ser Glu Glu Tyr Asp Val Gln Asp Ser Ile
545 550 555 560
Ser Lys Glu Leu Val Leu Lys Arg Met Leu Leu Lys Xaa Cys Ile Tyr
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Gly Val Asp Ile Asn Pro Ile Ser Val Glu Ile Thr Met Leu Ser Leu
580 585 590

Trp Ile Asn Thr Phe Ile Phe Gly Thr Pro Leu Ser Phe Ile Glu His
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 Lys Arg Ile Lys Glu Ile Ile Thr Ile Leu Glu Asp Ile Tyr Gln Lys
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 660 665 670
 Lys Ile Tyr Lys Glu Tyr Glu Glu Ser Lys Asp Ile Asp Asn Leu Arg
 675 680 685
 Ile Ile Phe Ser Leu Ile Lys Leu Tyr Ser Leu Ser Phe Asp Lys Ser
 690 695 700
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 705 710 715 720
 Asn Ile Leu Gly Asn Lys Thr Ser Ser Glu Asp Lys Glu Lys Ile Glu
 725 730 735
 Lys Ile Arg Lys Leu Ser Ser Tyr Tyr Lys Phe Phe His Tyr Gly Ile
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 Glu Phe Pro Asp Ile Gln Glu Gly Phe Asp Ile Val Ile Gly Asn Pro
 755 760 765
 Pro Trp Glu Lys Thr Lys Phe Asn Glu Thr Glu Phe Phe Ser Lys His
 770 775 780
 Ile Pro Asn Tyr Arg Lys Leu Gly Ile Lys Glu Gln Asn Ile Ile Lys
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 Gln Glu Ile Leu Ser Lys Asp Asn His Pro Leu Ser Ile Glu Tyr Asn
 805 810 815
 Glu Glu Lys Asn Ser Ile Ile Ala Ile Asn Asn Ile Tyr Lys Phe Asp
 820 825 830
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 835 840 845
 Val Thr Phe Asn Leu Lys Leu Ile Lys Glu Lys Gly Asn Leu Thr Tyr
 850 855 860
 Leu Val Pro Ser Ala Ile Trp Asn Glu Ser Ser Ser Arg Ile Leu Arg
 865 870 875 880
 Lys His Ile Phe Ala Arg Tyr Lys Leu Asn Tyr Ile Tyr Gln Phe Glu
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Phe	Phe	Glu	Asp	Lys	Asp	Ala	Lys	Glu	Ser	Ser	Lys	Leu	Leu	Trp	Ile	1045	1050	1055
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Phe	Ile	Ile	Ser	Ile	Phe	Asn	Ser	Phe	Val	Phe	Asp	Phe	Leu	Leu	Arg	1125	1130	1135
Arg	Phe	Val	Asp	Ser	Asn	Val	Leu	Lys	Ser	Cys	Leu	Tyr	Gln	Cys	Pro	1140	1145	1150
Met	Pro	Gln	Pro	Glu	Glu	Lys	Glu	Ile	Leu	Ser	Asn	Pro	Leu	Tyr	Leu	1155	1160	1165
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Asn	Phe	Lys	Tyr	Leu	Leu	Tyr	Leu	Glu	Tyr	Phe	Lys	Phe	Asp	Lys	Glu	1185	1190	1195

Lys Val Asn Lys Ile Leu Lys Leu Asp Lys Glu Asp Glu Phe Phe Lys
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Glu Lys Glu Asn Glu Asn Asn Phe Ile Ile Ala Ser Leu Tyr Ser Leu
1220 1225 1230

Ala Lys Glu Asp Phe Ile Thr Leu Leu Gly Asp Phe Lys Ala Leu Lys
1235 1240 1245

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<213> *Borrelia burgdorferi*

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<211> 65

<212> PRT

<213> *Borrelia burgdorferi*

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Asp Glu Gln Phe Thr Tyr His Tyr Ile Lys Asn Glu Ala Ile Ile Glu
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Leu
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<210> 19

<211> 1113

<212> DNA

<213> *Borrelia burgdorferi*

<400> 19

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 <213> Borrelia burgdorferi

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Lys Ile Lys Val Asn Lys Asp Ala Ala Asn Tyr Lys Ile Leu Asn Leu
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Gly Asn Gly Gln Asp Gln Phe Gly Lys Glu Lys Thr Leu Leu Lys Thr
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Ala Met Ser Asn Phe Phe Asn Ser Ser Glu Glu Ser Leu Lys Ser Ala
  85               90              95

Asp Leu Phe Ile Tyr Lys Asp Lys Pro Glu Glu Leu Lys Lys Tyr Leu
 100              105              110

Lys Val His Arg His Thr Phe Val Val Leu Ile Asn Thr Glu Gly Asp
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Asn Ser Asp Asp Gly Leu Lys Ile Tyr Lys Asp Asp Tyr Asp Lys Phe
 130              135              140

Lys Thr Pro Ser Ile Phe Phe Val Phe Ser Thr Lys Glu Gln Glu Ile
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Lys Glu Leu Phe Lys Asp Lys Gly Asn Thr Glu Lys Glu Arg Asn Ile
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 Ala Val Tyr Ser Asn Asn Lys Asp Asn Leu His Leu Lys Phe Ile Ser
 180 185 190
 Gln Tyr Leu His Gln Ala Ser Ile Phe His Ala Val Asn Pro Tyr Gly
 195 200 205
 Met Pro Leu Ala Ala Thr Pro Leu Val Asp Asp Thr Val Ile Gly Lys
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 Leu Arg Thr Ala Lys Ile Asn Phe Tyr Ser Leu Leu Asn Glu Thr Gly
 225 230 235 240
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 245 250 255
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 260 265 270
 Ile Glu Leu Ile Arg Ile Trp Asn Lys Asn Asn Arg Gln Asn Ser Lys
 275 280 285
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 290 295 300
 Ala Ile Glu Cys Leu Leu Lys Arg Phe Val Asp Arg Gly Leu Ile Ile
 305 310 315 320
 Gln Tyr Lys Asn Leu Ser Leu Thr Leu Ser Pro Thr Pro Gln Leu Lys
 325 330 335
 Leu Glu Leu Ser Val Asn Ile Thr Tyr Asn Phe Ser Ile Asn Ala Val
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<211> 1088

<212> DNA

<213> *Borrelia burgdorferi*

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 <213> *Borrelia burgdorferi*

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 Lys Asn Ile Ile Phe Leu Leu
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<210> 23
 <211> 750
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 <213> *Borrelia burgdorferi*

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 aatacttcaa attatattat aattccagtt caatcagaaa tatggtcaat agaaagtgtt 480
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Leu Thr Ser Tyr Phe Thr Lys Tyr Ile Pro Asp Ala Glu Thr Tyr Asn	50	55	60
Val Tyr Ser Met Leu Lys Gly Asp Phe Tyr Phe Lys Lys Tyr Leu Asn	65	70	75
Lys Ile Asn Asp Tyr Met Tyr Ile Ile Pro Ser His Pro Met Leu Glu	85	90	95
Lys Phe Asn Thr Glu Thr Asp Gln Glu Thr Phe Leu Glu Tyr Tyr Leu	100	105	110
Asn Arg Asn Ile Ile Asn Cys Asp Phe Asp Tyr Ile Leu Leu Asp Thr	115	120	125
Ser Pro Gly Ser Asn Leu Leu Leu Lys Ser Ala Leu Asn Thr Ser Asn	130	135	140
Tyr Ile Ile Ile Pro Val Gln Ser Glu Ile Trp Ser Ile Glu Ser Phe	145	150	155
Asn Ile Leu Ile Asn Ile Ile Asn Gly Ile Thr Lys His Arg Glu Lys	165	170	175
Lys Tyr Asn Ile Ser Ile Val Glu Asn Gln Phe Ile Lys Asn Arg Asn	180	185	190
Ile Leu Lys Glu Val Glu Asn Leu Ile His Lys Glu Tyr Lys Glu Tyr	195	200	205
Ile Lys Gly Lys Ile His Phe Tyr Asn Ser Ile Lys Val Leu Ile Thr	210	215	220
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<210> 25

<211> 509

<212> DNA

<213> *Borrelia burgdorferi*

<400> 25

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<210> 26

<211> 67

<212> PRT

<213> *Borrelia burgdorferi*

<400> 26

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Ser Thr Asn Pro Val Lys Phe Ile Leu Phe Ala Asn Lys Ile Lys Asn
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Phe Pro Asn Ser Tyr Tyr Asn Tyr Leu Val Asn Asn Leu Arg Lys Ile
 35 40 45

Gly Tyr Lys Asn Ile Pro Ile Leu Val Glu Leu Lys Glu Lys Ile Arg
 50 55 60

Asp Leu Lys
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<210> 27

<211> 1302

<212> DNA

<213> *Borrelia burgdorferi*

<400> 27

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1302

<210> 28

<211> 433

<212> PRT

<213> *Borrelia burgdorferi*

<400> 28

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Lys Ser Ala Leu Phe Asn Arg Ile Leu Asp Thr Lys Arg Ser Ile Thr
20 25 30

Glu Ser Thr Tyr Gly Val Thr Arg Asp Leu Val Glu Glu Val Cys Lys
35 40 45

Val Asp Ser Phe Lys Phe Lys Leu Ile Asp Thr Gly Gly Phe Thr Ile
50 55 60

Leu Lys Asp Glu Ile Ser Lys Ile Val Val Gln Lys Val Leu Ser Ser
65 70 75 80

Leu Glu Lys Val Asp Leu Ile Leu Leu Val Leu Asp Ile Asn Glu Ile
85 90 95

Leu Leu Glu Asp Tyr Gln Ile Ile Glu Arg Leu Arg Lys Tyr Ser Ser
100 105 110

Lys Val Val Leu Val Leu Asn Lys Val Asp Thr Lys Asp Lys Glu Cys
115 120 125

Leu Ala His Glu Phe His Asn Leu Gly Phe Lys Arg Tyr Phe Leu Val
130 135 140

Ser Ala Ala His Cys Arg Gly Ile Thr Lys Leu Arg Asp Phe Leu Lys
145 150 155 160

Val Glu Val Gly Glu Val Gly Ile Glu Ser Gly Ala Asp Ile Lys Val
165 170 175

Gly Ile Ile Gly Lys Pro Asn Ser Gly Lys Ser Thr Leu Ile Asn Tyr
180 185 190

Leu Ser Gly Asn Glu Ile Ala Ile Val Ser Asp Gln Pro Gly Thr Thr
195 200 205

Arg Asp Phe Ile Lys Thr Lys Phe Thr Arg Asn Gly Lys Val Phe Glu
210 215 220

Val Val Asp Thr Ala Gly Ile Arg Arg Arg Ala Arg Val Asn Glu Ile
225 230 235 240

Val Glu Tyr Tyr Ser Val Asn Arg Ala Leu Lys Val Ile Asp Met Val
245 250 255

Asp Ile Val Phe Leu Leu Ile Asp Val Gln Glu Lys Leu Thr Ser Gln
 260 265 270
 Asp Lys Lys Ile Ala His Tyr Val Thr Lys Lys Gly Lys Gly Ile Val
 275 280 285
 Ile Val Phe Ser Lys Trp Asp Leu Val Asp Glu Ser Lys Gly Tyr Phe
 290 295 300
 Glu Ala Leu Lys Ser His Val Lys Phe Phe Phe Pro Ile Leu Asn Phe
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 Ala Pro Ile Phe Arg Ile Ser Val His Lys Arg Ile Gly Leu Asp Ser
 325 330 335
 Leu Phe Lys Glu Ser Phe Lys Leu Lys Asp Gln Leu Glu Leu Lys Thr
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 Ser Thr Pro Asp Leu Asn Lys Met Leu Asn Leu Trp Ile Lys Asp Tyr
 355 360 365
 His Leu Asn Ile Ser His Lys Ile Lys Tyr Ile Thr Gln Val Ser Thr
 370 375 380
 Asn Pro Val Lys Phe Ile Leu Phe Ala Asn Lys Ile Lys Asn Phe Pro
 385 390 395 400
 Asn Ser Tyr Tyr Asn Tyr Leu Val Asn Asn Leu Arg Lys Ile Gly Tyr
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 Lys Asn Ile Pro Ile Leu Val Glu Leu Lys Glu Lys Ile Arg Asp Leu
 420 425 430

Lys

<210> 29
 <211> 924
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 29
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 gaagaagcaa aaagcaaacg agaaataatg cttgatactc ttgctgactt taatgatgaa 420
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 ttttaaaggt cttggccttg aatt 924

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 <211> 198
 <212> PRT
 <213> *Borrelia burgdorferi*

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 20 25 30
 Ile Thr Val Asp Arg Gln Leu Lys Arg Tyr Ser Val Pro Arg Leu Ala
 35 40 45
 Phe Val Asn Lys Cys Asp Lys Thr Gly Ala Asn Pro Tyr Asn Val Lys
 50 55 60
 Asp Gln Leu Arg Ser Lys Leu Asp Leu Asn Ser Val Leu Met Gln Ile
 65 70 75 80
 Pro Ile Gly Leu Glu Asp Lys His Ile Gly Val Ile Asp Leu Val Leu
 85 90 95
 Met Lys Ala Tyr Tyr Phe Glu Gly Lys Asp Gly Thr Glu Ile Ile Glu
 100 105 110
 Lys Glu Ile Pro Ser Asp Leu Leu Glu Glu Ala Lys Ser Lys Arg Glu
 115 120 125
 Ile Met Leu Asp Thr Leu Ala Asp Phe Asn Asp Glu Leu Met Glu Leu
 130 135 140
 His Met Glu Gly Lys Glu Val Pro Thr Glu Ile Ile Tyr Asn Ala Thr
 145 150 155 160
 Arg Thr Gly Thr Leu Ala Leu Lys Leu Cys Pro Val Phe Met Gly Ser
 165 170 175
 Ala Tyr Lys Asn Lys Gly Val Asn Ile Leu Asn Leu Glu His Leu Leu
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 Glu Leu Leu Leu Val Tyr
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<210> 31
 <211> 2082
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 31
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acaatagcat cagctgcaac tcacgttgaa tggaaagatt ttccgataaa tattattgat 240
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ggaaaagcag aattctcaat ggaattctta aggtatggaa aagttccaag cactatattt 2040
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<210> 32

<211> 693

<212> PRT

<213> *Borrelia burgdorferi*

<400> 32

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Ser Gly Lys Thr Thr Leu Thr Glu Arg Ile Leu Phe Tyr Cys Asn Lys
20 25 30

Ile His Ala Ile His Glu Val Lys Gly Lys Asp Gly Val Gly Ala Thr
35 40 45

Met Asp Ser Met Glu Leu Glu Arg Glu Arg Gly Ile Thr Ile Ala Ser
50 55 60

Ala Ala Thr His Val Glu Trp Lys Asp Phe Pro Ile Asn Ile Ile Asp
65 70 75 80

Thr	Pro	Gly	His	Val	Asp	Phe	Thr	Ile	Glu	Val	Glu	Arg	Ser	Leu	Arg	85	90	95
Val	Leu	Asp	Gly	Ala	Ile	Leu	Val	Leu	Asp	Ser	Val	Ala	Gly	Val	Gln	100	105	110
Ser	Gln	Ser	Ile	Thr	Val	Asp	Arg	Gln	Leu	Lys	Arg	Tyr	Ser	Val	Pro	115	120	125
Arg	Leu	Ala	Phe	Val	Asn	Lys	Cys	Asp	Lys	Thr	Gly	Ala	Asn	Pro	Tyr	130	135	140
Asn	Val	Lys	Asp	Gln	Leu	Arg	Ser	Lys	Leu	Asp	Leu	Asn	Ser	Val	Leu	145	150	155
Met	Gln	Ile	Pro	Ile	Gly	Leu	Glu	Asp	Lys	His	Ile	Gly	Val	Ile	Asp	165	170	175
Leu	Val	Leu	Met	Lys	Ala	Tyr	Tyr	Phe	Glu	Gly	Lys	Asp	Gly	Thr	Glu	180	185	190
Ile	Ile	Glu	Lys	Glu	Ile	Pro	Ser	Asp	Leu	Leu	Glu	Glu	Ala	Lys	Ser	195	200	205
Lys	Arg	Glu	Ile	Met	Leu	Asp	Thr	Leu	Ala	Asp	Phe	Asn	Asp	Glu	Leu	210	215	220
Met	Glu	Leu	His	Met	Glu	Gly	Lys	Glu	Val	Pro	Thr	Glu	Ile	Ile	Tyr	225	230	235
Asn	Ala	Thr	Arg	Thr	Gly	Thr	Leu	Ala	Leu	Lys	Leu	Cys	Pro	Val	Phe	245	250	255
Met	Gly	Ser	Ala	Tyr	Lys	Asn	Lys	Gly	Val	Gln	Leu	Leu	Leu	Asp	Ala	260	265	270
Val	Thr	Arg	Phe	Leu	Pro	Ser	Pro	His	Asp	Ile	Lys	Asn	Thr	Ala	Leu	275	280	285
Asp	Leu	Asn	Asn	Asn	Glu	Lys	Glu	Ile	Asp	Leu	Lys	Ile	Asp	Asn	Glu	290	295	300
Leu	Pro	Thr	Val	Ala	Leu	Ala	Phe	Lys	Leu	Glu	Asp	Gly	Gln	Tyr	Gly	305	310	315
Gln	Leu	Thr	Tyr	Val	Arg	Ile	Tyr	Gln	Gly	Ile	Leu	Lys	Lys	Gly	Gln	325	330	335
Glu	Leu	Ile	Asn	Ser	Arg	Thr	Ser	Lys	Lys	Phe	Lys	Val	Gly	Arg	Leu	340	345	350
Ile	Arg	Met	His	Ala	Asn	Asn	Thr	Glu	Asp	Ile	Glu	Phe	Gly	Gly	Ser	355	360	365
Gly	Asp	Ile	Val	Ala	Leu	Phe	Gly	Ile	Glu	Cys	Ala	Ser	Gly	Asp	Thr	370	375	380

Phe	Cys	Asp	Pro	Ser	Ile	Asn	Tyr	Ser	Met	Thr	Ser	Met	Phe	Ile	Pro	385	390	395	400
Asp	Pro	Val	Ile	Ser	Leu	Ser	Val	Lys	Pro	Lys	Asp	Lys	Lys	Ser	Ala	405	410	415	
Asp	Asn	Met	Ala	Lys	Ala	Leu	Gly	Arg	Phe	Thr	Lys	Glu	Asp	Pro	Thr	420	425	430	
Phe	Lys	Thr	Tyr	Val	Asp	Ile	Glu	Ser	Asn	Glu	Thr	Ile	Ile	Gln	Gly	435	440	445	
Met	Gly	Glu	Leu	His	Leu	Glu	Val	Tyr	Ile	Glu	Arg	Met	Lys	Arg	Glu	450	455	460	
Phe	Lys	Ala	Glu	Val	Glu	Thr	Gly	Met	Pro	Gln	Val	Ala	Tyr	Arg	Glu	465	470	475	480
Thr	Ile	Thr	Arg	Lys	Ala	Glu	Phe	Asn	Tyr	Thr	His	Lys	Lys	Gln	Ser	485	490	495	
Gly	Gly	Ala	Gly	Gln	Phe	Gly	Arg	Val	Ala	Gly	Phe	Met	Glu	Pro	Leu	500	505	510	
Asp	Lys	Glu	Gly	Glu	Thr	Tyr	Glu	Phe	Val	Asn	Leu	Ile	Lys	Gly	Gly	515	520	525	
Val	Ile	Pro	Thr	Glu	Tyr	Ile	Pro	Ser	Cys	Asp	Lys	Gly	Phe	Gln	Lys	530	535	540	
Ala	Met	Glu	Arg	Gly	Thr	Leu	Ile	Gly	Phe	Pro	Ile	Val	Asp	Ile	Lys	545	550	555	560
Ile	Thr	Ile	Asn	Asp	Gly	Gln	Tyr	His	Ile	Val	Asp	Ser	Ser	Asp	Ile	565	570	575	
Ala	Phe	Gln	Leu	Ala	Ala	Ile	Gly	Ala	Phe	Arg	Glu	Ala	Tyr	Glu	Lys	580	585	590	
Ala	Lys	Pro	Thr	Ile	Leu	Glu	Pro	Ile	Met	Lys	Val	Thr	Leu	Glu	Gly	595	600	605	
Pro	Thr	Glu	Phe	Gln	Gly	Asn	Met	Phe	Gly	Leu	Leu	Asn	Gln	Arg	Arg	610	615	620	
Gly	Ile	Ile	Thr	Gly	Ser	Leu	Glu	Asp	Gly	Ser	Phe	Ser	Lys	Val	Glu	625	630	635	640
Ala	Glu	Val	Pro	Leu	Ser	Glu	Met	Phe	Gly	Phe	Ser	Thr	Val	Leu	Arg	645	650	655	
Ser	Ser	Thr	Gln	Gly	Lys	Ala	Glu	Phe	Ser	Met	Glu	Phe	Leu	Arg	Tyr	660	665	670	
Gly	Lys	Val	Pro	Ser	Thr	Ile	Phe	Asp	Glu	Leu	Arg	Lys	Lys	Phe	Asn	675	680	685	

Asp Gln Asn Lys Ser
690

<210> 33
<211> 908
<212> DNA
<213> *Borrelia burgdorferi*

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<210> 34
<211> 302
<212> PRT
<213> *Borrelia burgdorferi*

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20 25 30
Tyr Ser Leu Lys Pro Val Ala Asn Arg Leu Ser Glu Leu Leu Gly Gln
35 40 45
Asp Val Lys Met Leu Ser Asp Cys Ile Gly Ser Glu Val Val Asn Ser
50 55 60
Thr Leu Gln Met Lys Asp Gly Asp Val Val Leu Leu Glu Asn Val Arg
65 70 75 80
Phe Tyr Ala Glu Glu Glu Lys Asn Asp Lys Asn Phe Ala Lys Lys Leu
85 90 95
Ser Glu Asn Gly Asp Val Phe Val Asn Asp Ala Phe Gly Ala Ala His
100 105 110
Arg Ala His Ala Ser Thr Val Gly Val Ala Asp Tyr Leu Pro Ser Val
115 120 125

Gly Gly Phe Leu Met Glu Lys Glu Asp Lys Phe Leu Gly Gly Ile Leu
 130 135 140
 Lys Asn Pro Glu Arg Pro Phe Val Ser Ile Ile Gly Gly Ser Lys Val
 145 150 155 160
 Ser Ser Lys Ile Ala Val Leu Glu Ser Leu Leu Ser Lys Ser Asn Val
 165 170 175
 Val Val Ile Gly Gly Gly Met Ala Tyr Thr Phe Leu His Ser Glu Gly
 180 185 190
 Tyr Ser Ile Gly Lys Ser Leu Leu Glu Asp Glu Tyr Ile Gly Ile Ala
 195 200 205
 Ser Ser Phe Leu Lys Lys Ala Lys Glu Leu Gly Val Lys Val Ile Leu
 210 215 220
 Pro Leu Asp His Ile Val Ala Asp Asp Phe Asn Lys Asn Ser Ile Pro
 225 230 235 240
 Glu Tyr Ile Asp Ser Phe Asn Ile Pro Glu Asn Lys Ile Gly Met Asp
 245 250 255
 Ile Gly Ala Asn Thr Leu Lys Glu Ile Glu Asn Val Val Lys Thr Ala
 260 265 270
 Lys Thr Ile Ile Trp Asn Gly Pro Leu Gly Val Phe Glu Phe Asp Ser
 275 280 285
 Phe Ser Lys Gly Thr Ala Lys Val Ala Glu Met Val Ala Ser
 290 295 300

<210> 35

<211> 1182

<212> DNA

<213> *Borrelia burgdorferi*

<400> 35

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 <211> 393
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 <213> *Borrelia burgdorferi*

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 35 40 45
 Lys Glu Arg Gly Ala Arg Ile Val Leu Val Ser His Leu Gly Arg Pro
 50 55 60
 Asp Gly Lys Lys Asn Pro Lys Tyr Ser Leu Lys Pro Val Ala Asn Arg
 65 70 75 80
 Leu Ser Glu Leu Leu Gly Gln Asp Val Lys Met Leu Ser Asp Cys Ile
 85 90 95
 Gly Ser Glu Val Val Asn Ser Thr Leu Gln Met Lys Asp Gly Asp Val
 100 105 110
 Val Leu Leu Glu Asn Val Arg Phe Tyr Ala Glu Glu Glu Lys Asn Asp
 115 120 125
 Lys Asn Phe Ala Lys Lys Leu Ser Glu Asn Gly Asp Val Phe Val Asn
 130 135 140
 Asp Ala Phe Gly Ala Ala His Arg Ala His Ala Ser Thr Val Gly Val
 145 150 155 160
 Ala Asp Tyr Leu Pro Ser Val Gly Gly Phe Leu Met Glu Lys Glu Asp
 165 170 175
 Lys Phe Leu Gly Gly Ile Leu Lys Asn Pro Glu Arg Pro Phe Val Ser
 180 185 190
 Ile Ile Gly Gly Ser Lys Val Ser Ser Lys Ile Ala Val Leu Glu Ser
 195 200 205
 Leu Leu Ser Lys Ser Asn Val Val Val Ile Gly Gly Gly Met Ala Tyr
 210 215 220
 Thr Phe Leu His Ser Glu Gly Tyr Ser Ile Gly Lys Ser Leu Leu Glu
 225 230 235 240

Asp Glu Tyr Ile Gly Ile Ala Ser Ser Phe Leu Lys Lys Ala Lys Glu
 245 250 255
 Leu Gly Val Lys Val Ile Leu Pro Leu Asp His Ile Val Ala Asp Asp
 260 265 270
 Phe Asn Lys Asn Ser Ile Pro Glu Tyr Ile Asp Ser Phe Asn Ile Pro
 275 280 285
 Glu Asn Lys Ile Gly Met Asp Ile Gly Ala Asn Thr Leu Lys Glu Ile
 290 295 300
 Glu Asn Val Val Lys Thr Ala Lys Thr Ile Ile Trp Asn Gly Pro Leu
 305 310 315 320
 Gly Val Phe Glu Phe Asp Ser Phe Ser Lys Gly Thr Ala Lys Val Ala
 325 330 335
 Glu Met Val Ala Ser Cys Ser Gly Leu Thr Val Val Gly Gly Gly Asp
 340 345 350
 Ser Val Ala Ala Val Asn Lys Phe Asn Leu Ser Asp Lys Ile Thr His
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<210> 37
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 <212> DNA
 <213> *Borrelia burgdorferi*

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<210> 38
 <211> 85
 <212> PRT
 <213> *Borrelia burgdorferi*

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115					120					125						
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Ser	Gly	Ile	Thr	Tyr	Val	Lys	Arg	Tyr	Ala	Leu	Val	Ala	Ala	Leu	Gly	
145					150					155					160	
Ile	Glu	Ser	Glu	Ile	Asp	Thr	Asp	Ala	Ala	Pro	Ile	Tyr	Asn	Asn	His	
165					170					175						
Glu	Asn	Glu	Asn	Ser	Met	Pro	Ser	Lys	Gln	Ser	Ser	Val	Asn	Gln	Lys	
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Gln	Glu	Gln	Lys	Arg	Glu	Gln	Lys	Gln	Glu	Ile	Asn	Gln	Ile	Gln	Lys	
195					200					205						
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210					215					220						
Lys	Asp	Arg	Leu	Tyr	Tyr	Tyr	Gly	Val	Phe	Lys	Glu	Ala	Leu	Ser	Asn	
225					230					235					240	
Ile	Lys	Asp	Trp	Val	Asn	Ser	Pro	Thr	Thr	Lys	Asp	Asn	Ile	Asn	Ser	
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260					265					270						
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275					280					285						
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Tyr	Phe	Lys	Lys	Asn	Asn	Arg	Leu	Lys	Asp	Leu	Gln	Asp	Phe	Glu	Lys	
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Phe	Val	Ser	Phe	Lys	Arg	Thr	Ala	Tyr	Gly	Pro	Ser	Pro	Leu	Ile	Phe	
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345

350

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 <213> *Borrelia burgdorferi*

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 tatcctttta ttagatttgc aaatttaatt gaatttgaaa tttttaaaat ttaattgcag 180
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<210> 42
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 <212> PRT
 <213> *Borrelia burgdorferi*

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 <212> DNA
 <213> *Borrelia burgdorferi*

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<210> 44
 <211> 30
 <212> PRT
 <213> *Borrelia burgdorferi*

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<212> DNA
 <213> *Borrelia burgdorferi*

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 gatctaattg acaaaaatgt tgcaaatagt ttgcaaagt tttaaattaga ccttttgtca 180
 aagggtatta atataaaaga agtttcaata gaagagatta attttatttt atcaatttat 240
 tatataattt ctctgttga agcatcctcc aatcttgctc gttatactgg actttgttac 300
 ggcaagagaa tctctgaagg tttgagtcct aatgattttt attttaaaca taggag 356

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 <212> PRT
 <213> *Borrelia burgdorferi*

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 35 40 45
 Asn Ser Phe Ala Lys Phe Lys Leu Asp Leu Leu Ser Lys Gly Ile Asn
 50 55 60
 Ile Lys Glu Val Ser Ile Glu Glu Ile Asn Phe Ile Leu Ser Ile Tyr
 65 70 75 80
 Tyr Ile Ile Ser Pro Val Glu Ala Ser Ser Asn Leu Ala Arg Tyr Thr
 85 90 95
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<210> 47
 <211> 1491
 <212> DNA
 <213> *Borrelia burgdorferi*

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 tttgatgatt ctttagagat tgcaaaaagg tatgacgatt gtttaaaaaa ttgtgaatta 240
 gaagatttgc ctttaattgg tatgcttatt gcagtcaaag ataatatctc aattcaagat 300
 aaatctttta cttgtgcttc tgagatttta aaagggtata tttctcctta tgatgcgact 360
 gttattaaaa ggcttaagaa taaaggagca attttaattg gtagaaccaa tatggatgaa 420
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gaggaaggat tgtcaattgg gatgcaaat attgggcgta gcaaaaagga ttttgaactt 1440
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<210> 48

<211> 496

<212> PRT

<213> *Borrelia burgdorferi*

<400> 48

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Arg Lys Cys Lys Ile Tyr Asp Ile Leu Leu Ala Tyr Lys Asn Asn Tyr
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Glu Leu Asn Lys Asp Ile Asn Gly Tyr Ile Glu Phe Phe Asp Asp Ser
          50                      55                     60

Leu Glu Ile Ala Lys Arg Tyr Asp Asp Cys Leu Lys Asn Cys Glu Leu
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Glu Asp Leu Pro Leu Ile Gly Met Leu Ile Ala Val Lys Asp Asn Ile
          85                      90                     95

Ser Ile Gln Asp Lys Ser Leu Thr Cys Ala Ser Glu Ile Leu Lys Gly
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Tyr Ile Ser Pro Tyr Asp Ala Thr Val Ile Lys Arg Leu Lys Asn Lys
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Gly Ala Ile Leu Ile Gly Arg Thr Asn Met Asp Glu Phe Ala Met Gly
          130                     135                    140

Ser Thr Cys Glu Phe Ser Tyr Tyr Gly Ala Thr Leu Asn Pro Leu Asn
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Arg Glu Tyr Val Ile Gly Gly Ser Ser Gly Gly Ser Ala Ala Val Val
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Tyr	Gly	Gly	Leu	Ser	Arg	Tyr	Gly	Leu	Ala	Ser	Tyr	Ala	Ser	Ser	Phe		
	210					215					220						
Asp	Gln	Ile	Gly	Phe	Phe	Ser	His	Ser	Ile	Glu	Asp	Ile	Ala	Leu	Ile		
225					230					235					240		
Leu	Lys	His	Thr	Cys	Gly	Ser	Asp	Lys	Met	Asp	Ser	Thr	Ser	Val	Asp		
				245					250					255			
Ile	Phe	Asp	Asp	Phe	Tyr	Pro	Leu	Lys	Ile	Glu	Ser	Leu	Gln	Gly	Lys		
			260					265					270				
Asn	Leu	Ala	Val	Ile	Lys	Glu	Leu	Ser	Glu	Asp	Leu	Met	Asp	Lys	Asn		
		275					280					285					
Val	Ala	Asn	Ser	Phe	Ala	Lys	Phe	Lys	Leu	Asp	Leu	Leu	Ser	Lys	Gly		
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Ile	Asn	Ile	Lys	Glu	Val	Ser	Ile	Glu	Glu	Ile	Asn	Phe	Ile	Leu	Ser		
305					310					315					320		
Ile	Tyr	Tyr	Ile	Ile	Ser	Pro	Val	Glu	Ala	Ser	Ser	Asn	Leu	Ala	Arg		
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Tyr	Thr	Gly	Leu	Cys	Tyr	Gly	Lys	Arg	Ile	Ser	Glu	Gly	Leu	Ser	Leu		
			340					345					350				
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Lys	Arg	Arg	Ile	Val	Leu	Gly	Asn	Tyr	Leu	Leu	Ser	Glu	Arg	Tyr	Asp		
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Ser	Lys	Tyr	Tyr	Ala	Lys	Ala	Cys	Glu	Ile	Leu	Gln	Asn	Leu	Ile	Ile		
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Pro	Lys	Phe	Asn	Lys	Leu	Phe	Glu	Ser	Cys	Asp	Phe	Ile	Ile	Thr	Pro		
				405					410					415			
Thr	Ser	Phe	Val	Lys	Pro	Phe	Arg	Leu	Gly	Leu	Asp	Phe	Asp	Asp	Pro		
			420					425					430				
Val	Lys	Met	Tyr	Tyr	Ser	Asp	Ile	Cys	Thr	Val	Ile	Ala	Asn	Leu	Ile		
		435					440					445					
Gly	Ala	Pro	Ala	Ile	Ser	Leu	Pro	Tyr	Ser	Lys	Asp	Glu	Glu	Gly	Leu		
	450					455					460						
Ser	Ile	Gly	Met	Gln	Ile	Ile	Gly	Arg	Ser	Lys	Lys	Asp	Phe	Glu	Leu		
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<210> 49
<211> 436
<212> DNA
<213> *Borrelia burgdorferi*

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<211> 145
<212> PRT
<213> *Borrelia burgdorferi*

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35 40 45
Glu Thr Ile Leu Gln Ala Leu Leu Tyr Glu Phe Gly Tyr Ala Tyr Thr
50 55 60
Phe Ser Ser Val Gly Lys Leu Gln Ile Leu Pro Ile Trp Lys Ser Glu
65 70 75 80
Val Ile Thr Lys Glu Ile Glu Ile Cys Thr Val Asp Ala Glu Ser Tyr
85 90 95
Val Met Ser Lys Ser Ser Ser Ser Ser Tyr Asp Ser Thr Lys Val Ile
100 105 110
Trp Arg Glu Gly Lys Phe Gln Ser Lys Glu Glu Ala Met Ser Lys Lys
115 120 125
Arg Pro Leu Tyr Ser Ala Pro Ile Asn Val Ala Gly Thr Asp Gly Ala
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Leu
145

<210> 51
<211> 2691
<212> DNA
<213> *Borrelia burgdorferi*

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gatattgtat tctacacgga cgaggggtcaa atttttgaac ttaccctttt tgttgacact 240
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 <213> *Borrelia burgdorferi*

<400> 52

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				85					90					95	
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Val	Ile	Ile	Asp	Ser	Gly	Glu	Asp	Val	Glu	Thr	Ile	Leu	Gln	Ala	Leu
225					230					235					240
Leu	Tyr	Glu	Phe	Gly	Tyr	Ala	Tyr	Thr	Phe	Ser	Ser	Val	Gly	Lys	Leu
			245						250					255	
Gln	Ile	Leu	Pro	Ile	Trp	Lys	Ser	Glu	Val	Ile	Thr	Lys	Glu	Ile	Glu
		260						265					270		

Ile	Cys	Thr	Val	Asp	Ala	Glu	Ser	Tyr	Val	Met	Ser	Lys	Ser	Ser	Ser	275	280	285	
Ser	Ser	Tyr	Asp	Ser	Thr	Lys	Val	Ile	Trp	Arg	Glu	Gly	Lys	Phe	Gln	290	295	300	
Ser	Lys	Glu	Glu	Ala	Met	Ser	Lys	Lys	Arg	Pro	Leu	Tyr	Ser	Ala	Pro	305	310	315	320
Ile	Asn	Val	Ala	Gly	Thr	Asp	Gly	Ala	Leu	Tyr	Val	Ala	Val	Leu	Gln	325	330	335	
Lys	Gly	Val	Val	Tyr	Pro	Asp	Phe	Ala	Asp	Lys	Val	Gly	Ser	Ser	Val	340	345	350	
Phe	Gln	Glu	Tyr	Asp	Pro	Ser	Trp	Leu	Asp	Thr	Val	Tyr	Lys	Trp	Asp	355	360	365	
Phe	Lys	Arg	Arg	Glu	Val	Trp	His	Asp	His	Tyr	Ala	Ile	Asn	Glu	His	370	375	380	
Leu	Ala	Ile	Ile	Ser	Thr	His	Asn	Leu	Glu	Val	Arg	Phe	Ser	Ala	Asp	385	390	395	400
Ser	Ser	Ile	Lys	Leu	Glu	Asn	Lys	Glu	Tyr	Phe	Pro	Thr	Lys	Ala	Lys	405	410	415	
Leu	Trp	Phe	Arg	Asn	Thr	Ser	Ser	Ser	Gln	Gly	Ser	Lys	Tyr	Ile	Tyr	420	425	430	
His	Phe	Asp	Ile	Tyr	Gly	Asp	Val	Phe	Tyr	Thr	Ile	Ala	Gln	Asn	Val	435	440	445	
Leu	Gln	Thr	Asp	Asn	Ala	Asp	Asp	Phe	Tyr	Ser	Lys	Lys	Phe	Glu	Tyr	450	455	460	
Thr	Thr	Arg	Phe	Ile	Phe	Ser	Glu	Asp	Ser	Ala	Leu	Arg	Leu	Phe	Glu	465	470	475	480
Phe	Leu	Thr	Asn	Leu	Arg	Val	Lys	Gly	His	Thr	Ile	Val	Asn	Phe	Arg	485	490	495	
Ser	Met	Gln	Asn	Leu	Asn	Ile	Thr	Asp	Phe	Val	Lys	Leu	Arg	Leu	Asp	500	505	510	
Asn	Ile	Gly	Ile	Asp	His	Phe	Phe	Leu	Ile	Leu	Ser	Lys	Lys	Ile	Thr	515	520	525	
Asn	Phe	Asp	Leu	Asp	Ile	Lys	Leu	Tyr	Glu	Tyr	Glu	Gly	Ile	Thr	Trp	530	535	540	
Gly	Asp	Tyr	Thr	His	Tyr	Glu	Tyr	Leu	Thr	Thr	Ser	Thr	Lys	Ile	Gly	545	550	555	560
Ile	Ser	Asp	Tyr	Leu	Ser	Gly	Ala	His	Lys	Val	Val	Ile	Ala	Pro	Phe	565	570	575	

Asn	Tyr	Asp	Gly	Ala	Glu	Thr	Tyr	Gln	Phe	Lys	Ala	Ser	Gly	Phe	Lys	580	585	590
Asp	Glu	Asn	Thr	Leu	Asn	Gly	Ser	Ile	Glu	Phe	Ala	Lys	Gln	Ala	Gly	595	600	605
Leu	Asn	Lys	Ile	Lys	Leu	Leu	Lys	Gly	Asp	Phe	Tyr	Ile	Tyr	Asp	Gln	610	615	620
Val	Lys	Leu	Asn	Asn	Leu	Glu	Ile	Glu	Gly	Asp	Asp	Glu	Val	Phe	Ile	625	630	635
Arg	Ser	Thr	Gly	Phe	Ser	Lys	His	Ile	Phe	Thr	Ser	Glu	Lys	Ser	Phe	645	650	655
Arg	Leu	Ser	Gly	Val	Asn	Ile	Cys	Gln	Gln	Pro	Met	Ser	Glu	Leu	Tyr	660	665	670
Ile	Asn	Gly	Gly	Asp	Leu	Asn	Gln	Gln	Glu	Leu	Ala	Pro	Tyr	Leu	Glu	675	680	685
Asp	Lys	Ser	Phe	Thr	Gln	Pro	Ala	Val	Val	Val	Leu	Cys	Ser	Ser	Tyr	690	695	700
Ser	Leu	Gln	Glu	Glu	Ala	Arg	Ser	Ser	Val	Tyr	Val	Thr	Asp	Ala	Ser	705	710	715
Phe	Val	Tyr	Ile	Lys	Asn	Val	Thr	Phe	Thr	Cys	Ala	Leu	Asn	Lys	Ala	725	730	735
Leu	His	Phe	Lys	Lys	Thr	Lys	Lys	Ile	Leu	Leu	Glu	Asp	Val	Asn	Phe	740	745	750
Asp	Ser	Thr	Asn	Gln	Ser	Phe	Asp	Ile	Glu	Asn	Val	Thr	Asn	Leu	Thr	755	760	765
Leu	Ile	Asn	Val	Asn	Ala	Gln	Gly	Ser	Lys	Thr	Ala	Ser	Val	Ala	Asn	770	775	780
Gly	Leu	Asn	Ala	Ile	Ile	Arg	Glu	Ser	Phe	Phe	Thr	Asn	Asn	Thr	Asn	785	790	795
Ala	Leu	Lys	Leu	Ser	Asn	Phe	Ser	Ser	Leu	Lys	Ile	Thr	Asp	Thr	Gln	805	810	815
Phe	Ile	Lys	Asn	Ser	Gly	Thr	Ala	Leu	His	Leu	Gln	Asp	Ile	Thr	Ser	820	825	830
Ala	Arg	Leu	Ser	Asn	Asn	Thr	Phe	Thr	Glu	Asn	Lys	Val	Gly	Leu	Glu	835	840	845
Asn	His	Ala	Phe	Asp	Leu	Ile	Val	Arg	Asp	Thr	Phe	Val	Lys	Asn	Thr	850	855	860
Leu	Ala	Leu	Asn	Leu	Ala	Arg	Lys	Ser	Asn	Ala	Gly	Val	Arg	Thr	Leu	865	870	875

Asp Leu Ser Thr Tyr Met Glu Asn Thr Lys Asp Lys Gln Glu Val Ala
885 890 895

<210> 53
<211> 526
<212> DNA
<213> *Borrelia burgdorferi*

<400> 53
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ttaaagaaaa agtcaatata cgacaaaatt aaagcattgt ttatatcaag ctttgacca 120
ttgcaaattg aaaatattat tttttcattc ttaaagaaag aaaaaataaa taatagcggc 180
aaattaaaaa tatttaatta tacagacaaa gaagtagaag aagaaatata taagggtcaa 240
aaagaaatta aaagcaaaat tctaaatgaa agtctaacia atgaagcaat atacactgaa 300
aacaatttaa aagacatata ctttgctatc atactatcac tatcacctag cctgatattt 360
tctttcctaa ataacacaaa attcatgaca gacaccttgc tgtaaatatt tattagtgtg 420
gcaatctata tacctataat gctaaaaatt aattacaaat gtttgtcttt ttttgtttac 480
gccgccttaa tgataagcat tatattgccc ttggatttag aaatta 526

<210> 54
<211> 175
<212> PRT
<213> *Borrelia burgdorferi*

<400> 54
Gln Ile Lys Ile Asp Thr Leu Asn Ile Pro Ile Thr Arg Asp Ile Tyr
1 5 10 15
Ser Leu Thr Ile Leu Lys Lys Lys Ser Ile Tyr Asp Lys Ile Lys Ala
20 25 30
Leu Phe Ile Ser Ser Phe Ala Pro Leu Gln Met Glu Asn Ile Ile Phe
35 40 45
Ser Phe Leu Lys Lys Glu Lys Ile Asn Asn Ser Gly Lys Leu Lys Ile
50 55 60
Phe Asn Tyr Thr Asp Lys Glu Val Glu Glu Glu Ile His Lys Val Gln
65 70 75 80
Lys Glu Ile Lys Ser Lys Ile Leu Asn Glu Ser Leu Thr Asn Glu Ala
85 90 95
Ile Tyr Thr Glu Asn Asn Leu Lys Asp Ile Tyr Phe Ala Ile Ile Leu
100 105 110
Ser Leu Ser Pro Ser Leu Ile Phe Ser Phe Leu Asn Asn Thr Lys Phe
115 120 125
Met Thr Asp Thr Leu Leu Leu Ile Phe Ile Ser Val Ala Ile Tyr Ile
130 135 140

Pro Ile Met Leu Lys Ile Asn Tyr Lys Cys Leu Ser Phe Phe Val Tyr
 145 150 155 160

Ala Ala Leu Met Ile Ser Ile Ile Leu Pro Leu Asp Leu Glu Ile
 165 170 175

<210> 55
 <211> 2322
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 55
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 attaacgaga ttcaaatacc tgaatatgcc ctaatacccc ttgaaacaga aaattcaaaa 120
 tccataatat acataattga aaaacaaaaa atagaagaaa atcaaatttt atccaaaaac 180
 tcaaacatag agctatacac atattctcca atatctggaa tagtagaaaa aatatacaca 240
 gccaattttc cagatggaaa aaatttaaaa tcagcattaa tcaaatttca aggaaaaata 300
 aaaactgaaa aaacaccaat tgaagaagga gcctcaagag aaaaaacctt ggaaaaatta 360
 attcaactgg gaattccttg gtttaacgaa aattctttat ttcaattcat aaacaaatgt 420
 aaaaaaatag acaaaatgat tttattaaca aacggaaaag atgcatttac aaatatttca 480
 gaagcactga tggcagaaaa attagaagaa attttttcag gattccaaat aatcgacaaa 540
 atattcaaat tcaaagaaat aataataata atatcaaata aagacaaact aaaaaagaa 600
 ttcgaaaaat tgagtatttt taaaaacaga aaaataaaaa ttaaattcttt agaaaatgca 660
 tatccttata caaatcacga aatgataatg cactttttat acaataataa aaatacaaaa 720
 gatgatataa atccccacaa caatatttta ttagcaaata ttgaagatct atacaatgca 780
 aatcttgtca taaaaaataa caacccttat aaagaaaaat ttgtagctat aaatggaaat 840
 aaaaaataaa aaagtagaat actgaaggta aaaattggaa cctctttcag ccagctaata 900
 aatgagaaaa ttgacacaaa aaaatatgaa atttttttaa acaaccagc caataaaata 960
 aaaatcgata cattaaacat accgataaca agagatatatt atagtctcac catattaaag 1020
 aaaaagtcaa tatacgacaa aattaaagca ttgtttatat caagctttgc accattgcaa 1080
 atggaaaata ttattttttc attcttaaag aaagaaaaaa taaataatag cggcaaat 1140
 aaaatattta attatacaga caaagaagta gaagaagaaa tacataaggt tcaaaaagaa 1200
 attaaaagca aaattctaaa tgaaagtcta acaaatgaag caatatacac tgaaaacaat 1260
 ttaaaagaca tatactttgc tatcactata tcaactcac ctagcctgat attttctttc 1320
 ctaaataaca caaaattcat gacagacacc ttgctgttaa tatttattag tgtggcaatc 1380
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 ttaatgataa gcattatatt gcccttggat ttagaaatta cactaaaaat aatttcctta 1500
 ttattttactt ttttggattt cttttacttt ttcagactat cagcattttt ggcaaaccct 1560
 atattaattt cttttatggt tttggtatta aattttccgg taagttttaa gcaagcctat 1620
 caagaggaac ttaaaaattc aaattcaata attccaacct ggaatgaaat aattgaaaca 1680
 aatccaaaca taaaaaattt aaaaagttaa aataccttta caagatatga aagtaaaaaa 1740
 atagatgcaa ttgaaaactt tgtaaatcaa aacatttttt ccgcttttaa tataattgtc 1800
 acaagatttc atattgaaag tcttttggga gttaataatg aaaaaaaaaa atctcctatc 1860
 ttgctttatt ttggcctctt attaatagtt ggcaaatata taatcaacaa attaatacca 1920
 ctctcatttt atataagctt aatggcaatc tcgtacatag cacataatat aggaatgcta 1980
 aaccacatca gctccgacat gttaacacta cttattttct caatcccaat gctgttaata 2040
 tttacaatgg caacagaatt gcaaataaca cctcacttta aatttgagca aatactctac 2100
 ggatcaatat tggcatttat atactttttg acattaagct acattccttt tgaaacttta 2160
 tcagtcataa tatctatttt catcttacia acaagctcaa acttaataaa aaaatatagc 2220
 ttaaccttca aaattaaaaa aataatgcat gttttgaaaa caaataaaga aaaagcactc 2280
 aaaacacctc ttgagaatga aaaggatata ataaaattat ga 2322

<210> 56
 <211> 773
 <212> PRT

<213> Borrelia burgdorferi

<400> 56

Met Leu Asp Leu Glu Lys Val Lys Thr Ile Phe Lys Lys Tyr Asn Lys
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Tyr Glu Ile Asn Ile Asn Glu Ile Gln Ile Pro Glu Tyr Ala Leu Ile
20 25 30
Pro Leu Glu Thr Glu Asn Ser Lys Ser Ile Ile Tyr Ile Ile Glu Lys
35 40 45
Gln Lys Ile Glu Glu Asn Gln Ile Leu Ser Lys Asn Ser Asn Ile Glu
50 55 60
Leu Tyr Thr Tyr Ser Pro Ile Ser Gly Ile Val Glu Lys Ile Tyr Thr
65 70 75 80
Ala Asn Phe Pro Asp Gly Lys Asn Leu Lys Ser Ala Leu Ile Lys Phe
85 90 95
Gln Gly Lys Ile Lys Thr Glu Lys Thr Pro Ile Glu Glu Gly Ala Ser
100 105 110
Arg Glu Lys Thr Leu Glu Lys Leu Ile Gln Leu Gly Ile Pro Trp Phe
115 120 125
Asn Glu Asn Ser Leu Phe Gln Phe Ile Asn Lys Cys Lys Lys Ile Asp
130 135 140
Lys Met Ile Leu Leu Thr Asn Gly Lys Asp Ala Phe Thr Asn Ile Ser
145 150 155 160
Glu Ala Leu Met Ala Glu Lys Leu Glu Glu Ile Phe Ser Gly Phe Gln
165 170 175
Ile Ile Asp Lys Ile Phe Lys Phe Lys Glu Ile Ile Ile Ile Ile Ser
180 185 190
Asn Lys Asp Lys Leu Lys Lys Glu Phe Glu Lys Leu Ser Ile Phe Lys
195 200 205
Asn Arg Lys Ile Lys Ile Lys Ser Leu Glu Asn Ala Tyr Pro Tyr Thr
210 215 220
Asn His Glu Met Ile Met His Phe Leu Tyr Asn Asn Lys Asn Thr Lys
225 230 235 240
Asp Asp Ile Asn Pro His Asn Asn Ile Leu Leu Ala Asn Ile Glu Asp
245 250 255
Leu Tyr Asn Ala Asn Leu Val Ile Lys Asn Asn Asn Pro Tyr Lys Glu
260 265 270
Lys Phe Val Ala Ile Asn Gly Asn Lys Lys Ile Lys Ser Arg Ile Leu
275 280 285

Lys Val Lys Ile Gly Thr Ser Phe Ser Gln Leu Ile Asn Glu Lys Ile
 290 295 300
 Asp Thr Lys Lys Tyr Glu Ile Phe Leu Asn Asn Pro Ala Asn Lys Ile
 305 310 315 320
 Lys Ile Asp Thr Leu Asn Ile Pro Ile Thr Arg Asp Ile Tyr Ser Leu
 325 330 335
 Thr Ile Leu Lys Lys Lys Ser Ile Tyr Asp Lys Ile Lys Ala Leu Phe
 340 345 350
 Ile Ser Ser Phe Ala Pro Leu Gln Met Glu Asn Ile Ile Phe Ser Phe
 355 360 365
 Leu Lys Lys Glu Lys Ile Asn Asn Ser Gly Lys Leu Lys Ile Phe Asn
 370 375 380
 Tyr Thr Asp Lys Glu Val Glu Glu Glu Ile His Lys Val Gln Lys Glu
 385 390 395 400
 Ile Lys Ser Lys Ile Leu Asn Glu Ser Leu Thr Asn Glu Ala Ile Tyr
 405 410 415
 Thr Glu Asn Asn Leu Lys Asp Ile Tyr Phe Ala Ile Ile Leu Ser Leu
 420 425 430
 Ser Pro Ser Leu Ile Phe Ser Phe Leu Asn Asn Thr Lys Phe Met Thr
 435 440 445
 Asp Thr Leu Leu Leu Ile Phe Ile Ser Val Ala Ile Tyr Ile Pro Ile
 450 455 460
 Met Leu Lys Ile Asn Tyr Lys Cys Leu Ser Phe Phe Val Tyr Ala Ala
 465 470 475 480
 Leu Met Ile Ser Ile Ile Leu Pro Leu Asp Leu Glu Ile Thr Leu Lys
 485 490 495
 Ile Ile Ser Leu Leu Phe Thr Phe Leu Val Phe Phe Tyr Phe Phe Arg
 500 505 510
 Leu Ser Ala Phe Leu Ala Asn Pro Ile Leu Ile Ser Phe Met Phe Leu
 515 520 525
 Val Leu Asn Phe Pro Val Ser Phe Lys Gln Ala Tyr Gln Glu Glu Leu
 530 535 540
 Lys Asn Ser Asn Ser Ile Ile Pro Thr Trp Asn Glu Ile Ile Glu Thr
 545 550 555 560
 Asn Pro Asn Ile Lys Asn Leu Lys Ser Leu Asn Thr Phe Thr Arg Tyr
 565 570 575
 Glu Ser Lys Lys Ile Asp Ala Ile Glu Asn Phe Val Asn Gln Asn Ile
 580 585 590

Phe Ser Ala Phe Asn Ile Ile Val Thr Arg Phe His Ile Glu Ser Leu
 595 600 605
 Leu Gly Val Asn Asn Glu Lys Lys Ile Ser Pro Ile Leu Leu Tyr Phe
 610 615 620
 Gly Leu Leu Leu Ile Val Gly Lys Tyr Ile Ile Asn Lys Leu Ile Pro
 625 630 635 640
 Leu Ser Phe Tyr Ile Ser Leu Met Ala Ile Ser Tyr Ile Ala His Asn
 645 650 655
 Ile Gly Met Leu Asn His Ile Ser Ser Asp Met Leu Thr Leu Leu Ile
 660 665 670
 Ser Pro Ile Pro Met Leu Leu Ile Phe Thr Met Ala Thr Glu Leu Gln
 675 680 685
 Ile Thr Pro His Phe Lys Phe Glu Gln Ile Leu Tyr Gly Ser Ile Leu
 690 695 700
 Ala Phe Ile Tyr Phe Leu Thr Leu Ser Tyr Ile Pro Phe Glu Thr Leu
 705 710 715 720
 Ser Val Ile Ile Ser Ile Phe Ile Leu Gln Thr Ser Ser Asn Leu Ile
 725 730 735
 Lys Lys Tyr Ser Leu Thr Phe Lys Ile Lys Lys Ile Met His Val Leu
 740 745 750
 Lys Thr Asn Lys Glu Lys Ala Leu Lys Thr Pro Leu Glu Asn Glu Lys
 755 760 765
 Asp Ile Ile Lys Leu
 770

<210> 57
 <211> 628
 <212> DNA
 <213> *Borrelia burgdorferi*

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 tcaaacattt tcaatacggg gcaaaaaata aacaaagcct ttgaatcttc aaaaacaaaa 120
 gctattgact cttttgttga gattgagaaa aatagtcacg tagttcacat aaaccatgga 180
 attggtatat ttaggcaaat aaagagaata aaaacaagct ctcttgaaaa ggattatatt 240
 gaaattgaat acgctgaagg agaaaaacta tttattccaa ttgaacaaac aaatttaatc 300
 caaaaataca ttggaagtga tcctaaaaat atcaaattag ataaaataag ttctaaaaca 360
 tggataaaaa acaaagcaaa cgcaaaaaaa agaatcgagg agattgcaga caaattaata 420
 gaactttatt caaaaagaga aagcattaag ggtattaaat acccagaaga taatgaatta 480
 caattgttgt ttgaatctga atttccatac gatgaaactc cagatcaaata aagagcaata 540
 aaagaaataa aagaagatat gatgagcttt aaagtaatgg atcgcttctt ttgtggagat 600
 gttggatttg gaaaaactga agttgccca 628

<210> 58

<211> 209
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 58
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 Ile Ile Leu Glu Ser Asn Ile Phe Asn Thr Gly Gln Lys Ile Asn Lys
 20 25 30
 Ala Phe Glu Ser Ser Lys Thr Lys Ala Ile Asp Ser Phe Val Glu Ile
 35 40 45
 Glu Lys Asn Ser His Val Val His Ile Asn His Gly Ile Gly Ile Phe
 50 55 60
 Arg Gln Ile Lys Arg Ile Lys Thr Ser Ser Leu Glu Lys Asp Tyr Ile
 65 70 75 80
 Glu Ile Glu Tyr Ala Glu Gly Glu Lys Leu Phe Ile Pro Ile Glu Gln
 85 90 95
 Thr Asn Leu Ile Gln Lys Tyr Ile Gly Ser Asp Pro Lys Asn Ile Lys
 100 105 110
 Leu Asp Lys Ile Ser Ser Lys Thr Trp Ile Lys Asn Lys Ala Asn Ala
 115 120 125
 Lys Lys Arg Ile Glu Glu Ile Ala Asp Lys Leu Ile Glu Leu Tyr Ser
 130 135 140
 Lys Arg Glu Ser Ile Lys Gly Ile Lys Tyr Pro Glu Asp Asn Glu Leu
 145 150 155 160
 Gln Leu Leu Phe Glu Ser Glu Phe Pro Tyr Asp Glu Thr Pro Asp Gln
 165 170 175
 Ile Arg Ala Ile Lys Glu Ile Lys Glu Asp Met Met Ser Phe Lys Val
 180 185 190
 Met Asp Arg Leu Leu Cys Gly Asp Val Gly Phe Gly Lys Thr Glu Val
 195 200 205
 Ala

<210> 59
 <211> 3378
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 59
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 aaagaatttt tagaacaaaa tatatttttt tcattaacag gatatgaagg atttttcaag 120
 gcttttttaa ttaaaaaaat caaagaatat agcaaaaccg ggaaaataat attaatagtt 180

aaagacgagc	acacattaga	taaaatcaaa	aacgatttac	aagtaattac	aatcaaatc	240
tttgagctta	actatcttag	cccccttgta	tacaagggca	ttggctcaaa	aagtacgatc	300
tttaacgaaa	gaatcaaatt	cttattcaat	ttttataaaa	aaaatcctgg	aatatatatt	360
acagtcttga	aatcattgct	tagcaaaaata	cccgataaaa	atacattact	aaagaatata	420
tataaaattg	aaaaaaatc	caatattaat	acagcagaca	ttgaaaaaac	tcttataaca	480
ttgggatatg	aaaaaacatt	aagagtaaca	attccaggag	aatttacagt	aaaaggagaa	540
attatagata	tatacccttt	tggagaacaa	aatccaataa	gaattgcact	aaactttgac	600
aaaatagaag	aaataaaaaa	atttaatccc	ttaacccaat	taaaacacga	taatgaaatt	660
ttagaattcc	aaattcttcc	aaaaaaagaa	attatttggg	acgataaaaac	tattaacacc	720
ttaaaaacaa	aaatttaaatc	tgttgaatat	aaaaagattc	ttgaagagtt	ggatttttaa	780
aaagaaacaa	aaacagaaga	aatgttttat	ccactagtag	caaatactta	cttaggtgat	840
gagattgaaa	aacacacacc	tattgttaac	tttgaaatta	acaatttcga	cttaggaaatt	900
gaaaaaatc	accaagaata	tgaaaagctt	tacaaagaag	cagaagaagc	cggtaaaaat	960
ataattgatc	caaaaagaat	tctcttaaat	tataaaacct	tcaatctaaa	aagcgatggt	1020
ttattttcaa	aaattaaaag	ccttaaatcc	aaagaaacta	tagagtttaa	aatcgaaagt	1080
gagagaaact	ttttttcaaa	tatagcactt	acaaaagaag	aatttgaaaa	ttggctgaaa	1140
aatggattta	aaatcattat	tgcagcagaa	tctgaatcac	aaaaagaaaa	acttaaatat	1200
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atagaaaaag	aaaaaattgc	cattattctt	gaatcaaaca	ttttcaatac	ggggcaaaaa	1320
ataaacaaag	cctttgaatc	ttcaaaaaca	aaagctattg	actcttttgt	tgagattgag	1380
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ctattttattc	caattgaaca	aacaaattta	atccaaaaat	acattggaag	tgatcctaaa	1560
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aaaagaatcg	aggagattgc	agacaaatta	atagaacttt	attcaaaaag	agaaagcatt	1680
aagggtatta	aataccagaa	agataatgaa	ttacaattgt	tgtttgaatc	tgaatttcca	1740
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tttaaagtta	tggatcgctt	tctttgtgga	gatgttggat	ttggaaaaac	tgaagttgcc	1860
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actatcttag	cagaacagca	tttcaataca	tttaaaaaaa	gatttaaaaa	ttttccaatc	1980
aaaatcgaag	tattaagcag	atttataaaa	aataacgcag	aaagccggat	cttaaaagaa	2040
cttaaaagtg	gaaaaattga	tataatcata	ggaacgcaca	aaattctttc	aaaaaaattc	2100
acctgcaaaa	atttaggggt	aataataatt	gatgaagaac	aaagatttgg	tgtaaaagaa	2160
aaagaaaaac	ttaaagaaat	aagaatttcg	gttgattgcc	ttgctctttc	tgcaacacca	2220
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ccgcctcaaa	acagagtaaa	aatagaagct	tatttagaat	catttagcga	acttttaata	2340
aaacatgcaa	ttgagagtga	actgtctcga	gatggtcaag	tttttttagt	aatcataat	2400
attgaagaac	tgtattatct	aaaaacacta	attgaaagat	taacccttta	tgcaagaatt	2460
gcaataattc	atggaaaact	aacaggagaa	gagattgaaa	atataatgca	caattttatt	2520
aaaaaagcgt	atcaaatctt	attggcaaca	acaataattg	aaaatggaat	agatattcca	2580
aatgcaataa	caataataat	aaataatgca	aacaagtttg	gacttgcaca	gctatatcaa	2640
ctaaaaggaa	gagttggaag	aggatctcag	aaagcttatg	cttatttttt	gtaccaagac	2700
agcgaagaagc	taaatgaacg	ctctattgaa	agattaagag	caataacaga	atttttcagag	2760
ctaggagcag	gattttaaatt	agcaatgaaa	gatatggaaa	taagaggtgt	tggaatttta	2820
cttggtagag	aacaacatgg	ggagattgag	tcgattggac	tagattacta	tctaacaatg	2880
ctaaataaag	caattgaaaa	gaaaatggga	aaaatctcat	cagatgaaga	agaggttgat	2940
attaaaaatta	actatagtgg	atttattcct	gaaaattatg	caaaaaatga	gcaggataaa	3000
atactaattct	acaaaaaaat	ctttaaaatt	caaactgaag	aggaaagtaa	aaaaataaga	3060
tcagagctcc	acaacgactt	tggcccaata	cccgaagaaa	taaacagtct	attaatgtta	3120
gctgaactta	aaattctagc	aaaagattta	aacataacaa	aattaaaaaga	aaaaaacagg	3180
gctttggaag	tagaatacaa	aaatatagaa	agcattccta	tggaaaaaat	aatagaaata	3240
cttcaaaaac	atcctaattt	attaatatta	aatccctcat	atcaaaaatc	aatattttta	3300
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<210> 60

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<211> 1125

<212> PRT

<213> *Borrelia burgdorferi*

<400> 60

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20 25 30

Thr Gly Tyr Glu Gly Phe Phe Lys Ala Phe Leu Ile Lys Lys Ile Lys
35 40 45

Glu Tyr Ser Lys Thr Gly Lys Ile Ile Leu Ile Val Lys Asp Glu His
50 55 60

Thr Leu Asp Lys Ile Lys Asn Asp Leu Gln Val Ile Thr Asn Gln Ile
65 70 75 80

Phe Glu Leu Asn Tyr Phe Ser Pro Leu Val Tyr Lys Gly Ile Gly Ser
85 90 95

Lys Ser Thr Ile Phe Asn Glu Arg Ile Lys Phe Leu Phe Asn Phe Tyr
100 105 110

Lys Lys Asn Pro Gly Ile Tyr Ile Thr Val Leu Lys Ser Leu Leu Ser
115 120 125

Lys Ile Pro Asp Lys Asn Thr Leu Leu Lys Asn Ile Tyr Lys Ile Glu
130 135 140

Lys Asn Thr Asn Ile Asn Thr Ala Asp Ile Glu Lys Thr Leu Ile Thr
145 150 155 160

Leu Gly Tyr Glu Lys Thr Leu Arg Val Thr Ile Pro Gly Glu Phe Thr
165 170 175

Val Lys Gly Glu Ile Ile Asp Ile Tyr Pro Phe Gly Glu Gln Asn Pro
180 185 190

Ile Arg Ile Ala Leu Asn Phe Asp Lys Ile Glu Glu Ile Lys Lys Phe
195 200 205

Asn Pro Leu Thr Gln Leu Lys His Asp Asn Glu Ile Leu Glu Phe Gln
210 215 220

Ile Leu Pro Lys Lys Glu Ile Ile Trp Asp Asp Lys Thr Ile Asn Thr
225 230 235 240

Leu Lys Thr Lys Ile Lys Ser Val Glu Tyr Lys Lys Ile Leu Glu Glu
245 250 255

Leu Asp Phe Lys Lys Glu Thr Lys Thr Glu Glu Met Phe Tyr Pro Leu
260 265 270

Val Ala Asn Thr Tyr Leu Gly Asp Glu Ile Glu Lys His Thr Pro Ile

25348199.1

275					280					285					
Val	Asn	Phe	Glu	Ile	Asn	Asn	Phe	Glu	Lys	Glu	Ile	Glu	Lys	Ile	His
290					295					300					
Gln	Glu	Tyr	Glu	Lys	Leu	Tyr	Lys	Glu	Ala	Glu	Glu	Ala	Gly	Lys	Asn
305					310					315					320
Ile	Ile	Asp	Pro	Lys	Arg	Ile	Leu	Leu	Asn	Tyr	Lys	Thr	Phe	Asn	Leu
				325					330					335	
Lys	Ser	Asp	Val	Leu	Phe	Ser	Lys	Ile	Lys	Ser	Leu	Lys	Ser	Lys	Glu
			340					345						350	
Thr	Ile	Glu	Phe	Lys	Ile	Glu	Ser	Glu	Arg	Asn	Phe	Phe	Ser	Asn	Ile
		355					360					365			
Ala	Leu	Thr	Lys	Glu	Glu	Phe	Glu	Asn	Trp	Leu	Lys	Asn	Gly	Phe	Lys
	370					375					380				
Ile	Ile	Ile	Ala	Ala	Glu	Ser	Glu	Ser	Gln	Lys	Glu	Lys	Leu	Lys	Tyr
385					390					395					400
Ile	Phe	Lys	Glu	Leu	Pro	Lys	Val	Ser	Ile	Glu	Val	Leu	Lys	Ile	Ser
			405						410					415	
Ser	Ser	Leu	Ile	Ile	Glu	Lys	Glu	Lys	Ile	Ala	Ile	Ile	Leu	Glu	Ser
		420					425						430		
Asn	Ile	Phe	Asn	Thr	Gly	Gln	Lys	Ile	Asn	Lys	Ala	Phe	Glu	Ser	Ser
	435					440					445				
Lys	Thr	Lys	Ala	Ile	Asp	Ser	Phe	Val	Glu	Ile	Glu	Lys	Asn	Ser	His
	450					455					460				
Val	Val	His	Ile	Asn	His	Gly	Ile	Gly	Ile	Phe	Arg	Gln	Ile	Lys	Arg
465					470					475					480
Ile	Lys	Thr	Ser	Ser	Leu	Glu	Lys	Asp	Tyr	Ile	Glu	Ile	Glu	Tyr	Ala
			485						490					495	
Glu	Gly	Glu	Lys	Leu	Phe	Ile	Pro	Ile	Glu	Gln	Thr	Asn	Leu	Ile	Gln
			500					505					510		
Lys	Tyr	Ile	Gly	Ser	Asp	Pro	Lys	Asn	Ile	Lys	Leu	Asp	Lys	Ile	Ser
	515						520					525			
Ser	Lys	Thr	Trp	Ile	Lys	Asn	Lys	Ala	Asn	Ala	Lys	Lys	Arg	Ile	Glu
	530					535					540				
Glu	Ile	Ala	Asp	Lys	Leu	Ile	Glu	Leu	Tyr	Ser	Lys	Arg	Glu	Ser	Ile
545					550					555					560
Lys	Gly	Ile	Lys	Tyr	Pro	Glu	Asp	Asn	Glu	Leu	Gln	Leu	Leu	Phe	Glu
			565						570					575	
Ser	Glu	Phe	Pro	Tyr	Asp	Glu	Thr	Pro	Asp	Gln	Ile	Arg	Ala	Ile	Lys

580					585					590					
Glu	Ile	Lys	Glu	Asp	Met	Met	Ser	Phe	Lys	Val	Met	Asp	Arg	Leu	Leu
		595					600					605			
Cys	Gly	Asp	Val	Gly	Phe	Gly	Lys	Thr	Glu	Val	Ala	Met	Arg	Ala	Ala
	610					615					620				
Phe	Lys	Ala	Val	Met	Gly	Asn	Lys	Gln	Val	Ile	Val	Leu	Ser	Pro	Thr
625					630					635					640
Thr	Ile	Leu	Ala	Glu	Gln	His	Phe	Asn	Thr	Phe	Lys	Lys	Arg	Phe	Lys
				645					650					655	
Asn	Phe	Pro	Ile	Lys	Ile	Glu	Val	Leu	Ser	Arg	Phe	Ile	Lys	Asn	Asn
			660					665					670		
Ala	Glu	Ser	Arg	Ile	Leu	Lys	Glu	Leu	Lys	Ser	Gly	Lys	Ile	Asp	Ile
		675					680					685			
Ile	Ile	Gly	Thr	His	Lys	Ile	Leu	Ser	Lys	Lys	Phe	Thr	Cys	Lys	Asn
	690					695					700				
Leu	Gly	Leu	Ile	Ile	Ile	Asp	Glu	Glu	Gln	Arg	Phe	Gly	Val	Lys	Glu
705					710					715					720
Lys	Glu	Lys	Leu	Lys	Glu	Ile	Arg	Ile	Ser	Val	Asp	Cys	Leu	Ala	Leu
				725					730					735	
Ser	Ala	Thr	Pro	Ile	Pro	Arg	Ser	Leu	His	Met	Ser	Leu	Ile	Lys	Leu
			740					745					750		
Arg	Asp	Ile	Ser	Val	Leu	Lys	Ile	Pro	Pro	Gln	Asn	Arg	Val	Lys	Ile
	755						760					765			
Glu	Ala	Tyr	Leu	Glu	Ser	Phe	Ser	Glu	Leu	Leu	Ile	Lys	His	Ala	Ile
	770					775					780				
Glu	Ser	Glu	Leu	Ser	Arg	Asp	Gly	Gln	Val	Phe	Leu	Val	Asn	His	Asn
785					790					795					800
Ile	Glu	Glu	Leu	Tyr	Tyr	Leu	Lys	Thr	Leu	Ile	Glu	Arg	Leu	Thr	Pro
				805					810				815		
Tyr	Ala	Arg	Ile	Ala	Ile	Ile	His	Gly	Lys	Leu	Thr	Gly	Glu	Glu	Ile
			820					825					830		
Glu	Asn	Ile	Met	His	Asn	Phe	Ile	Lys	Lys	Ala	Tyr	Gln	Ile	Leu	Leu
	835						840					845			
Ala	Thr	Thr	Ile	Ile	Glu	Asn	Gly	Ile	Asp	Ile	Pro	Asn	Ala	Asn	Thr
	850					855					860				
Ile	Ile	Ile	Asn	Asn	Ala	Asn	Lys	Phe	Gly	Leu	Ala	Gln	Leu	Tyr	Gln
865					870					875					880
Leu	Lys	Gly	Arg	Val	Gly	Arg	Gly	Ser	Gln	Lys	Ala	Tyr	Ala	Tyr	Phe

885					890					895					
Leu	Tyr	Gln	Asp	Ser	Glu	Lys	Leu	Asn	Glu	Arg	Ser	Ile	Glu	Arg	Leu
			900					905					910		
Arg	Ala	Ile	Thr	Glu	Phe	Ser	Glu	Leu	Gly	Ala	Gly	Phe	Lys	Ile	Ala
		915					920					925			
Met	Lys	Asp	Met	Glu	Ile	Arg	Gly	Val	Gly	Asn	Leu	Leu	Gly	Arg	Glu
	930					935					940				
Gln	His	Gly	Glu	Ile	Glu	Ser	Ile	Gly	Leu	Asp	Tyr	Tyr	Leu	Thr	Met
945					950					955					960
Leu	Asn	Lys	Ala	Ile	Glu	Lys	Lys	Met	Gly	Lys	Ile	Ser	Ser	Asp	Glu
				965					970					975	
Glu	Glu	Val	Asp	Ile	Lys	Ile	Asn	Tyr	Ser	Gly	Phe	Ile	Pro	Glu	Asn
			980					985					990		
Tyr	Ala	Lys	Asn	Glu	Gln	Asp	Lys	Ile	Leu	Ile	Tyr	Lys	Lys	Ile	Phe
		995					1000					1005			
Lys	Ile	Gln	Thr	Glu	Glu	Glu	Ser	Lys	Lys	Ile	Arg	Ser	Glu	Leu	His
	1010						1015				1020				
Asn	Asp	Phe	Gly	Pro	Ile	Pro	Glu	Glu	Ile	Asn	Ser	Leu	Leu	Met	Leu
1025					1030					1035					1040
Ala	Glu	Leu	Lys	Ile	Leu	Ala	Lys	Asp	Leu	Asn	Ile	Thr	Lys	Leu	Lys
			1045					1050					1055		
Glu	Lys	Asn	Arg	Ala	Leu	Glu	Ile	Glu	Tyr	Lys	Asn	Ile	Glu	Ser	Ile
		1060						1065				1070			
Pro	Met	Glu	Lys	Ile	Ile	Glu	Ile	Leu	Gln	Lys	His	Pro	Asn	Leu	Leu
	1075					1080					1085				
Ile	Leu	Asn	Pro	Ser	Tyr	Gln	Lys	Ser	Ile	Phe	Leu	Ser	Phe	Lys	Asn
	1090					1095				1100					
Ile	Glu	Lys	Ser	Glu	Lys	Ile	Asn	Tyr	Ile	Tyr	Lys	Asn	Ile	Asn	Leu
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Leu	Lys	Thr	Ser	Thr											
			1125												

<210> 61
 <211> 663
 <212> DNA
 <213> *Borrelia burgdorferi*

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 gttgacctag ctggaggtgc aatagacgaa caatttaccat accactatat aaaaaatgaa 180

gcgattattg agcttattag aatttggaac aaaaacaata gacaaaatag caaattatct 240
 gcactacaac ttagtggagc tagagacaat gcatatactt cagcaattga atgtttactg 300
 aaaagggttg tggatagagg actgataata gagtataaaa atttaaggct tactctttct 360
 cctacgccac aacttaaatt agaacttagc gtgaatatta cttataactt tagcattaat 420
 gctgttgctt tagtaattac tactcaagat atagttgatt atcaaaacag ctttaagtgc 480
 taaaaggggg gctaaaaatg caattttatg atttaagaga agttttattt tcaattgggtg 540
 gtacgcagtt acatagtggc aagctagagc ttacaagcga acctacaaca agagcagtga 600
 ttagtagtga agataaaggt atgcctgtaa taagcttaag agatcccaaa acaataactt 660
 atg 663

<210> 62
 <211> 160
 <212> PRT
 <213> *Borrelia burgdorferi*

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 20 25 30
 Gly Val Pro Ala Phe Lys Glu Gly Val Asp Leu Ala Gly Gly Ala Ile
 35 40 45
 Asp Glu Gln Phe Thr Tyr His Tyr Ile Lys Asn Glu Ala Ile Ile Glu
 50 55 60
 Leu Ile Arg Ile Trp Asn Lys Asn Asn Arg Gln Asn Ser Lys Leu Ser
 65 70 75 80
 Ala Leu Gln Leu Ser Gly Ala Arg Asp Asn Ala Tyr Thr Ser Ala Ile
 85 90 95
 Glu Cys Leu Leu Lys Arg Phe Val Asp Arg Gly Leu Ile Ile Glu Tyr
 100 105 110
 Lys Asn Leu Arg Leu Thr Leu Ser Pro Thr Pro Gln Leu Lys Leu Glu
 115 120 125
 Leu Ser Val Asn Ile Thr Tyr Asn Phe Ser Ile Asn Ala Val Ala Leu
 130 135 140
 Val Ile Thr Thr Gln Asp Ile Val Asp Tyr Gln Asn Ser Leu Ser Ala
 145 150 155 160

<210> 63
 <211> 1113
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 63

25348199.1

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gctaactata aaatattgaa ttttaaccgtt aataactatg aaaaacaaat tgaaacttta 180
gaaaaagata atgggaatgg acaagatcag tttggaaaag aaaaaacact gcttaaaacc 240
gcaatgtcga attttttcaa ttcaagttaa gaatcattaa aatcagccga tctttttatt 300
tataaggata aaccggaaga gttaaaaaaa tatcttaaag tacatagaca cacttttgtt 360
gtacttatta atactgaggg tgataattcc gatgatggac ttaagattta taaagatgat 420
tatgataagt ttaaaacacc ttcaattttt tttgtattct caactaaaga acaagaaata 480
aaagaactat ttaaagataa aggcaatact gaaaaagaaa gaaatattgc tgtttacagc 540
aataataaag acaatttaca cctcaaattt ataagtcaat atttacatca agctagtatt 600
tttcatgctg taaatcctta tggcatgccg ctggctgcta caccattgt tgatgatact 660
gtaattggaa agttgagAAC tgcaaaaatc aacttttatt cacttcttaa tgaaactggg 720
cttgatggtg taccgcgatt taaagaaggt gttgacctag ctggagggtg aatagacgaa 780
caattttacat accactatat aaaaaatgaa gcgattattg agcttattag aatttggAAC 840
aaaaacaata gacaaaatag caaattatct gcactacaac ttagtggagc tagagacaat 900
gcatatactt cagcaattga atgtttactg aaaagggttg tggatagagg actgataata 960
gagtataaaa atttaaggct tactctttct cctacgccac aacttaaatt agaacttagc 1020
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<210> 64
 <211> 370
 <212> PRT
 <213> *Borrelia burgdorferi*

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Ala Ser Arg Pro Asn Tyr Tyr Asn Pro Leu Leu Val Tyr Lys Thr Ala
      20                      25                     30

Lys Ile Lys Val Asn Lys Asp Ala Ala Ser Tyr Lys Ile Leu Asn Leu
      35                      40                     45

Thr Val Asn Asn Tyr Glu Lys Gln Ile Glu Thr Leu Glu Lys Glu Asn
      50                      55                     60

Gly Asn Gly Glu Asp Gln Phe Gly Lys Glu Lys Thr Leu Leu Lys Thr
      65                      70                     75                     80

Ala Met Ser Asn Phe Phe Asn Ser Ser Glu Glu Ser Leu Lys Ser Ala
      85                      90                     95

Asp Leu Phe Ile Tyr Lys Asp Lys Pro Glu Glu Leu Lys Asn Tyr Leu
      100                     105                    110

Lys Val His Arg His Thr Phe Val Val Leu Ile Asn Thr Glu Gly Asp
      115                     120                    125

Ala Ser Asp Asp Gly Leu Lys Ile Tyr Lys Asp Asp Tyr Asn Lys Phe
      130                     135                    140

Lys Lys Pro Ser Thr Phe Phe Val Phe Ser Thr Lys Glu Gln Glu Ile
      145                     150                    155                    160

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Lys Glu Leu Phe Lys Asp Lys Gly Asn Thr Glu Lys Glu Arg Asn Ile
 165 170 175
 Ala Val Tyr Ser Asn Asn Lys Asp Asn Leu His Leu Lys Phe Ile Ser
 180 185 190
 Gln Tyr Leu His Gln Ala Ser Ile Phe His Ala Val Asn Pro Tyr Gly
 195 200 205
 Met Pro Leu Ala Ala Thr Pro Leu Val Asp Asp Thr Val Ile Gly Lys
 210 215 220
 Leu Arg Thr Ala Lys Ile Asn Phe Tyr Ser Leu Leu Asn Glu Thr Gly
 225 230 235 240
 Leu Asp Gly Val Pro Ala Phe Lys Glu Gly Val Asp Leu Ala Gly Gly
 245 250 255
 Ala Ile Asp Glu Gln Phe Thr Tyr His Tyr Ile Lys Asn Glu Ala Ile
 260 265 270
 Ile Glu Leu Ile Arg Ile Trp Asn Lys Asn Asn Arg Gln Asn Ser Lys
 275 280 285
 Leu Ser Ala Leu Gln Leu Ser Gly Ala Arg Asp Asn Ala Tyr Thr Ser
 290 295 300
 Ala Ile Glu Cys Leu Leu Lys Arg Phe Val Asp Arg Gly Leu Ile Ile
 305 310 315 320
 Glu Tyr Lys Asn Leu Arg Leu Thr Leu Ser Pro Thr Pro Gln Leu Lys
 325 330 335
 Leu Glu Leu Ser Val Asn Ile Thr Tyr Asn Phe Ser Ile Asn Ala Val
 340 345 350
 Ala Leu Val Ile Thr Thr Gln Asp Ile Val Asp Tyr Gln Asn Ser Leu
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 Ser Ala
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<210> 65

<211> 473

<212> DNA

<213> *Borrelia burgdorferi*

<400> 65

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 ctaagcgctg aatttagtaa atttttaata aatgaatttt ttaaactaga aatcaaacad 180
 tgtcctcatg gacgaaaaat ttattacaaa atatctaaat ttgaacttga aaaaaaagtt 240
 gacagagcat aaaataaaac cagagttccc atgatgaaaa aaatcaaadc agaaatcaac 300
 ttgttaaaga tagaaaaaga caaaaattta attgagcttg gaaaaatatt aaaaaataat 360
 aatatagtag aattaaaaaa tttaaaccac tatcccaatt taaaattagt agaaaaagaa 420
 ttgtatcaaa tgaaaagcaa tttaaagcaa tcagaagaaa atgaaaacat att 473

<210> 66
 <211> 83
 <212> PRT
 <213> *Borrelia burgdorferi*

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 Thr Ile Asn Ser Leu Glu Ser Asp Leu Tyr Ala Thr Ile Ala Cys Arg
 20 25 30
 Lys Ala Val Lys Arg Asn Asp Met Leu Ser Ala Glu Phe Ser Lys Phe
 35 40 45
 Leu Ile Asn Glu Phe Phe Lys Leu Glu Ile Lys His Cys Pro His Gly
 50 55 60
 Arg Lys Ile Tyr Tyr Lys Ile Ser Lys Phe Glu Leu Glu Lys Lys Val
 65 70 75 80
 Asp Arg Ala

<210> 67
 <211> 1833
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 67
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 actaaaattg aggtttttct tgaagaaggg ggaattcaaa aaatcttaat aatagataat 180
 ggaagcggaa taagtaaaga agatttaaaa atctgctatc taccacacac tacttcaaaa 240
 atatcatcgg aagaagattt aagaaaaata gaaactctag gctttagggg agaggctctc 300
 tctagtattg caatttgctc caacatttca ataacaagct caacaactag caatgaaagc 360
 tatcaaatag aagtagaaaa tggaattgaa aaatgcttta aaaaacaacc cgccataaac 420
 ggaacaatag tagatgtcac aaaaatattt cacaacttcc cagcaaggaa aagattctta 480
 aagcaagaac ccattgaaac aaaaatgtgt ctaaaagttt tagaagaaaa aataataacc 540
 caccgcgaaa tcaatttcga aattaattta aatcaaaagc taagaaaaat ttactttaaa 600
 gaatcgttaa ttgacagggg tcaaaatgta tatggaaatg taatagaaaa taataaattt 660
 agggctctaa aaaaagaaca tgacaatata aaaaatagaaa ttttttagc accagataac 720
 ttttctaaaa aaagtaaaag acatatttaa acatttgtca acagaagacc tatcgatcaa 780
 aaagatctct tagaagcaat aactaatgga cacagcagaa tactttctcc tggcaacttc 840
 ccaatatgtt atttattttt agaaataaac cctgaatata ttgactttta tgtacaccct 900
 caaaaaaaag aagtaagatt ttacaatctt ccatttttat ttaaactaat atctgacaat 960
 attaataatt tttttgataa aaatataaat aactaccaag acataataat aaaaagacaa 1020
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 aacacatatg atataccaca aaacaataat ttagaaacag aagatgtaaa cgagccaaac 1140
 aaaaacacaa cacaaagcaa tattgacctt agaaggtata attcaattat acaaaataga 1200
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 gaatttttaa tcgttgaaaa aataaatgaa atttacttca tagaccaaca cgcagttcac 1380
 gaaaaaataa tatatgaaaa acttagaaat tcaaaaaaaa atgttcaaaa acttctagta 1440

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ccaattgaat tcacagtagt tgataaaaac atagaagaaa ttatagatag tgagattgaa 1500
gaatacaaac aaatggacat tataatctct aaaataggcc ctaaaaaata tcaacttgaa 1560
tctattccta atattttagt tcaatatgaa aatactctta ttaacttttt tcaatcaaga 1620
agaagtagga caataaattc tcttgaatct gacttatacg caactattgc ctgtagaaag 1680
gctgtcaaaa gaaatgacat gctaagcgct gaatttagta aatttttaat aaatgaattt 1740
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<210> 68

<211> 610

<212> PRT

<213> *Borrelia burgdorferi*

<400> 68

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Ala Gly Glu Ser Ile Asp Arg Pro Cys Ser Ile Leu Arg Glu Leu Leu
          20             25             30

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Asp Asn Ser Ile Asp Ser Gly Ala Thr Lys Ile Glu Val Phe Leu Glu
      35             40             45

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Glu Gly Gly Ile Gln Lys Ile Leu Ile Ile Asp Asn Gly Ser Gly Ile
      50             55             60

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Ser Lys Glu Asp Leu Lys Ile Cys Tyr Leu Pro His Thr Thr Ser Lys
      65             70             75             80

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Ile Ser Ser Glu Glu Asp Leu Arg Lys Ile Glu Thr Leu Gly Phe Arg
          85             90             95

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Gly Glu Ala Leu Ser Ser Ile Ala Ile Cys Ser Asn Ile Ser Ile Thr
      100            105            110

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Ser Ser Thr Thr Ser Asn Glu Ser Tyr Gln Ile Glu Val Glu Asn Gly
      115            120            125

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Ile Glu Lys Cys Phe Lys Lys Gln Pro Ala Ile Asn Gly Thr Ile Val
      130            135            140

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Asp Val Thr Lys Ile Phe His Asn Phe Pro Ala Arg Lys Arg Phe Leu
      145            150            155            160

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Lys Gln Glu Pro Ile Glu Thr Lys Met Cys Leu Lys Val Leu Glu Glu
          165            170            175

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Lys Ile Ile Thr His Pro Glu Ile Asn Phe Glu Ile Asn Leu Asn Gln
          180            185            190

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Lys Leu Arg Lys Ile Tyr Phe Lys Glu Ser Leu Ile Asp Arg Val Gln
          195            200            205

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Asn Val Tyr Gly Asn Val Ile Glu Asn Asn Lys Phe Arg Val Leu Lys
      210            215            220

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Lys Glu His Asp Asn Ile Lys Ile Glu Ile Phe Leu Ala Pro Asp Asn
 225 230 235 240
 Phe Ser Lys Lys Ser Lys Arg His Ile Lys Thr Phe Val Asn Arg Arg
 245 250 255
 Pro Ile Asp Gln Lys Asp Leu Leu Glu Ala Ile Thr Asn Gly His Ser
 260 265 270
 Arg Ile Leu Ser Pro Gly Asn Phe Pro Ile Cys Tyr Leu Phe Leu Glu
 275 280 285
 Ile Asn Pro Glu Tyr Ile Asp Phe Asn Val His Pro Gln Lys Lys Glu
 290 295 300
 Val Arg Phe Tyr Asn Leu Pro Phe Leu Phe Lys Leu Ile Ser Asp Asn
 305 310 315 320
 Ile Asn Asn Phe Phe Asp Lys Asn Ile Asn Asn Tyr Gln Asp Ile Ile
 325 330 335
 Ile Lys Arg Gln Leu Thr Glu Asp Asp His Leu Ile Glu Met Thr Asn
 340 345 350
 Gln Pro Glu Asn Phe Asn Lys Ile Asn Thr Tyr Asp Ile Pro Gln Asn
 355 360 365
 Asn Asn Leu Glu Thr Glu Asp Val Asn Glu Pro Asn Lys Asn Thr Thr
 370 375 380
 Gln Ser Asn Ile Asp Leu Arg Arg Tyr Asn Ser Ile Ile Gln Asn Arg
 385 390 395 400
 Pro Thr Leu Arg Glu Asn Ile Gly Asn Ile Phe Ser Asp Asn Phe Leu
 405 410 415
 Glu Phe Glu Glu Pro Pro Asn Lys Asn Glu Lys Glu Glu Ile Lys Phe
 420 425 430
 Asn Tyr Ile Gly Gln Ile Phe Ser Glu Phe Leu Ile Val Glu Lys Ile
 435 440 445
 Asn Glu Ile Tyr Phe Ile Asp Gln His Ala Val His Glu Lys Ile Ile
 450 455 460
 Tyr Glu Lys Leu Arg Asn Ser Lys Lys Asn Val Gln Lys Leu Leu Val
 465 470 475 480
 Pro Ile Glu Phe Thr Val Val Asp Lys Asn Ile Glu Glu Ile Ile Asp
 485 490 495
 Ser Glu Ile Glu Glu Tyr Lys Gln Met Asp Ile Ile Ile Ser Lys Ile
 500 505 510
 Gly Pro Lys Lys Tyr Gln Leu Glu Ser Ile Pro Asn Ile Cys Ser Gln
 515 520 525

Tyr Glu Asn Thr Leu Ile Asn Phe Phe Gln Ser Arg Arg Ser Arg Thr
 530 535 540

Ile Asn Ser Leu Glu Ser Asp Leu Tyr Ala Thr Ile Ala Cys Arg Lys
 545 550 555 560

Ala Val Lys Arg Asn Asp Met Leu Ser Ala Glu Phe Ser Lys Phe Leu
 565 570 575

Ile Asn Glu Phe Phe Lys Leu Glu Ile Lys His Cys Pro His Gly Arg
 580 585 590

Lys Ile Tyr Tyr Lys Ile Ser Lys Phe Glu Leu Glu Lys Lys Val Asp
 595 600 605

Arg Ala
 610

<210> 69
 <211> 984
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 69
 caattttaca acgaaattct taaaaaagat aataaaaaatt cttgcatct accaacaatg 60
 agtaaatatc ttgatataatt agaaaacaca aaaaccataa taaagctatc ttttaaaaaat 120
 catcccaaatt atataattta ttataaaaatt aattaccccc ttaaagtgtt ttgttcaaca 180
 atacaagact actatcaaac aatagcaaac aaactaaaac tacggctata actaaactat 240
 cctactacta tttaatcgta aaaaaaatatt tctttgcaaa ttaatcaatt tagaaatata 300
 aatgtaaaga catatctttt tatttgataa ataataaaaa ttactggggc actatttgga 360
 aaaattttta aaagaaatat taagtatgaa tagcaaaaat aggctatctt cacacttaat 420
 aattcttatt tacacgctaa acaacattga cctaaattca aaaaatattg ggtacaaaga 480
 gtttgaagag ttaaataaag cacatgaagc tgctttaagt agtagagaat cttagctagt 540
 gtagcttcaa agaagacatg acacttactt ataaataagg aagcttttgg attttaacaa 600
 aaatagtctg gcttttttgc acatataaaa caactccatt atttctaaga taaatatttt 660
 aagctccctg gtaaagtaat tcatttatcc tagatttact cttccacttc tatacgtccc 720
 gtccgtgctta atcattaatt tttaaaatta aatgtttctt tctagttacg cactatattg 780
 ttactataac aaaaattgaa tcttaaaaaat taacatatta ctttaaaaaa gtatacttat 840
 aggagatgct tataaagctt aacaaactta tttttaccaa tatatatata tctaatatct 900
 cttatactta gttgctcaat atctaaagat ttaagtata agctctcttc actaaaatct 960
 aatgattttt ttaattcaga cact 984

<210> 70
 <211> 76
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 70
 Gln Phe Tyr Asn Glu Ile Leu Lys Lys Asp Asn Lys Asn Ser Cys Asp
 1 5 10 15
 Leu Pro Thr Met Ser Lys Tyr Leu Asp Ile Leu Glu Asn Thr Lys Thr
 20 25 30

Ile Ile Lys Leu Ser Phe Lys Asn His Pro Lys Tyr Ile Ile Tyr Tyr


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agtaaagtta acttttacat ttatccaata tctaatatgc aaacagttgg gcttattaat 120
ttaggcacaa aatatagcaa ccatgcatac agtgcatac tagcatttaa tgctagtgtg 180
aaagcaattg aaatttttaa ggaggaatac aaaattgccg caagatacaa ttagtgtaag 240
tttgcttgac tctagaattc aagctagtag gcccaattat tataatccac ttttggttta 300
caaaacagcc aaaattaaag ttaataaaga tgctgctaac tataaaatat tgaatttaac 360
cgtaataaac tatgaaaaac aaattgaaac tttagaaaaa gataatggga atggacaaga 420
tcagtttgga aaagaaaaaa cactgcttaa aaccgcaatg tcgaattttt tcaattcaag 480
tgaagaatca ttaaaatcag ccgatctttt tatttataag gataaaccgg aagagttaaa 540
aaaatatctt aaagtacata gacacacttt tgttgacttt attaatactg agggtgataa 600
ttccgatgat ggacttaaga tttataaaga tgattatgat aagtttaaaa caccttcaat 660
tttttttgta ttctcaacta aagaacaaga aataaaagaa ctatttaaag ataaaggcaa 720
tactgaaaaa gaaagaaata ttgctgttta cagcaataat aaagacaatt tacacctcaa 780
atttataagt caatattttac atcaagctag tatttttcat gctgtaaatc cttatggcat 840
gccgctggct gctacaccac ttgttgatga tactgttaatt ggaaagttga gaactgcaa 900
aatcaacttt tattcacttc ttaatgaaac tgggcttgat ggtgtaccgg catttaaaga 960
aggtg

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<210> 74
 <211> 77
 <212> PRT
 <213> *Borrelia burgdorferi*

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<400> 74
Leu Leu His Asn Lys Ala His Lys Tyr Thr Leu Glu Ser Gln Ser Gln
 1             5             10            15
Pro Glu Tyr Ile Ser Lys Val Asn Phe Tyr Ile Tyr Pro Ile Ser Asn
          20             25            30
Met Gln Thr Val Gly Leu Ile Asn Leu Gly Thr Lys Tyr Ser Asn His
          35             40            45
Ala Tyr Ser Ala Ser Ile Ala Phe Asn Ala Ser Val Lys Ala Ile Glu
          50             55            60
Ile Leu Lys Glu Glu Tyr Lys Ile Ala Ala Arg Tyr Asn
          65             70            75

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<210> 75
 <211> 570
 <212> DNA
 <213> *Borrelia burgdorferi*

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<400> 75
atgattttta ctttagatat ggtttttaaac catttaactc aaatattcaa agggtttaag 60
gcgatgcaa ctgaaaataa ttttgagtgc gatatcataa atacttaca tccccgtac 120
ctttcaaaaa tcacagctgc tagctcaaata ataatagcat tgaaatttga tggtagagaa 180
aatctatttg atcataattc tagagccggg gcattttatg aaaatgcttt ggaattcagt 240
ttaaattttc aaatatatat tattgctata gtgttaaacy ctcaagattt tgacgctaata 300
tcacgtatgt taatgcttta tggtagcttt agcaattttc tacacaataa agcccataag 360
tatacttttag aaagtcaatc ccaaccgaa tatattagta aagttaactt ttacatttat 420
ccaatatcta atatgcaaac agttgggctt attaatttag gcacaaaata tagcaaccat 480
gcatacagtg catctatagc atttaatgct agtgtaaaag caattgaaat tttaaaggag 540
gaatacaaaa ttgccgcaag atacaattag

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<210> 76
 <211> 189
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 76
 Met Ile Phe Thr Leu Asp Met Val Leu Asn His Leu Thr Gln Ile Phe
 1 5 10 15
 Lys Gly Phe Lys Ala Tyr Ala Thr Glu Asn Asn Phe Glu Cys Asp Ile
 20 25 30
 Ile Asn Thr Tyr Asn His Pro Tyr Leu Ser Lys Ile Thr Ala Ala Ser
 35 40 45
 Ser Asn Ile Ile Ala Leu Lys Phe Asp Gly Thr Glu Asn Leu Phe Asp
 50 55 60
 His Asn Ser Arg Ala Gly Ala Phe Tyr Glu Asn Ala Leu Glu Phe Ser
 65 70 75 80
 Leu Asn Phe Gln Ile Tyr Ile Ile Ala Ile Val Leu Asn Ala Gln Asp
 85 90 95
 Phe Asp Ala Asn Ser Arg Met Leu Met Leu Tyr Gly Met Leu Ser Asn
 100 105 110
 Phe Leu His Asn Lys Ala His Lys Tyr Thr Leu Glu Ser Gln Ser Gln
 115 120 125
 Pro Glu Tyr Ile Ser Lys Val Asn Phe Tyr Ile Tyr Pro Ile Ser Asn
 130 135 140
 Met Gln Thr Val Gly Leu Ile Asn Leu Gly Thr Lys Tyr Ser Asn His
 145 150 155 160
 Ala Tyr Ser Ala Ser Ile Ala Phe Asn Ala Ser Val Lys Ala Ile Glu
 165 170 175
 Ile Leu Lys Glu Glu Tyr Lys Ile Ala Ala Arg Tyr Asn
 180 185

<210> 77
 <211> 403
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 77
 catgattttt ataaaagtaa tgctaaatth acaggattta tgtagataa attatttagt 60
 gatggaaaag aaataattaa aaaacttatg aaagaatata aagaattaaa aggataatat 120
 ggaaatttta tgaatagttt gacttacaga acatacaata tagaaagtat aaaaaatgaa 180
 tttttaaaga taggatttag tgaagaagca atagattttg tttttctgca taatgataat 240
 tacaactttg aattttttaa agaaaaattg attaattgtg aaaagaattt aaaaaggat 300
 atatctaatt tagacattaa gattgatact gtagaaaaga atttaaacac taaaatagac 360
 aatgttgaaa agaattttaa tctaaaaata gataatttag act 403

<210> 78
 <211> 38
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 78
 His Asp Phe Tyr Lys Ser Asn Ala Lys Phe Thr Gly Phe Met Leu Asp
 1 5 10 15
 Lys Leu Phe Ser Asp Gly Lys Glu Ile Ile Lys Lys Leu Met Lys Glu
 20 25 30
 Tyr Lys Glu Leu Lys Gly
 35

<210> 79
 <211> 543
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 79
 ttggatatta aggttaataa aagagattta agtgataatg aaaattatat tattactgat 60
 agtgtatttaa atcattataa ttcttttaaaa gaaaagttaa aaattaattc taaaaaggaa 120
 atctattgta agttagaac ttttaaaaatt ttaaaagaaa ttaaagacaa tcattattat 180
 aggtttgatg gttataaaaag ttttgaagct ttttctaaag attatagact tgcaagagca 240
 caggtctata attacttaaa aattgctaag gcaatagaag atgggattat acaagaagaa 300
 tttctaataa aaaatgggtat actggaaacg ttaattgtat taagaaataa agagagcaaa 360
 acaataaaaaa aatcaaaaaca aaaccgcgata aagcccttaa gatttcagct taaaagacaa 420
 gaaagctatg atttttataa aagtaatgct aaatttacag gatttatggt agataaatta 480
 tttagtgatg gaaaagaaat aattaaaaaa cttatgaaag aatataaaga attaaaagga 540
 taa 543

<210> 80
 <211> 186
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 80
 Met Glu Ile Glu Leu Asn Glu Arg Val Ile Ser Arg Ala Thr Asp Pro
 1 5 10 15
 Asp Gly Glu Lys Lys Leu Ile Thr Lys Glu Glu Ile Phe Ala His Tyr
 20 25 30
 Asn Asp Leu Lys Asn Arg Leu Lys Thr Asn Ile Lys Lys Lys Ile Phe
 35 40 45
 Tyr Lys Val Glu Ser Ile Arg Ile Leu Lys Glu Ile Lys Asp Asn Glu
 50 55 60
 Tyr Tyr Lys Leu Asp Gly Tyr Lys Ser Phe Asp Ala Phe Ile Lys Asp
 65 70 75 80

Tyr Gln Leu Ala Arg Thr Gln Val Tyr Ile Tyr Leu Lys Leu Ala Lys
 85 90 95
 Ala Leu Gln Ala Gly Ile Leu Asn Glu Asp Tyr Ile Ile Glu Asn Gly
 100 105 110
 Ile Tyr Asn Ser Leu Asp Lys Ile Glu Ser Gln Glu Thr Pro Ile Val
 115 120 125
 Lys Lys Ser Lys Gln Asn Pro Ile Lys Pro Leu Arg Phe Gln Leu Lys
 130 135 140
 Lys Gln Glu Ser Tyr Asp Phe Tyr Lys Ser Asn Ala Lys Phe Thr Gly
 145 150 155 160
 Phe Met Leu Asp Lys Leu Phe Ser Asp Gly Lys Glu Ile Ile Lys Lys
 165 170 175
 Leu Met Lys Glu Tyr Lys Glu Leu Lys Gly
 180 185

<210> 81
 <211> 1168
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 81
 caattcataa acaaatgtaa aaaaatagac aaaatgattt tattaacaaa cggaaaagat 60
 gcattttacaa atattttcaga agcactgatg gcagaaaaat tagaagaaat tttttcagga 120
 ttccaaataa tcgacaaaat attcaaattc aaagaaataa taataataat atcaaataaa 180
 gacaaactaa aaaaagaatt cgaaaaattg agtattttta aaaacagaaa aataaaaaatt 240
 aaatcttttag aaaatgcata tccttataca aatcacgaaa tgataatgca ctttttatac 300
 aataataaaa atacaaaaga tgatataaat cccacaaca atatttttatt agcaaattatt 360
 gaagatctat acaatgcaaa tcttgtcata aaaaataaca acccttataa agaaaaattt 420
 gtagctataa atggaaataa aaaaataaaa agtagaatac tgaaggtaaa aattggaacc 480
 tctttcagcc agctaataaa tgagaaaatt gacacaaaaa aatatgaaat ttttttaaac 540
 aaccagcca ataaaataaa aatcgatata ttaaatacag cgataacaag agatatttat 600
 agtctcacca tattaagaa aaagtcaata tacgacaaaa ttaaagcatt gtttatatca 660
 agctttgcac cattgcaaat ggaaaatatt attttttcat tcttaaagaa agaaaaaata 720
 aataatagcg gcaaatataa aatattttaat tatacagaca aagaagtaga agaagaaata 780
 cataaggttc aaaaagaaat taaaagcaaa attctaaatg aaagtctaac aaatgaagca 840
 atatacactg aaaacaattt aaaagacata tactttgcta tcatactatc actatcacct 900
 agcctgatat tttctttcct aaataacaca aaattcatga cagacacctt gctgttaata 960
 tttattagtg tggcaatcta tatacctata atgctaaaaa ttaattacaa atgtttgtct 1020
 ttttttggtt acgccgcctt aatgataagc attatattgc ccttggtatt agaaattaca 1080
 ctaaaaataa tttccttatt atttactttt ttggtattct tttacttttt cagactatca 1140
 gcatttttgg caaaccttat attaatatt 1168

<210> 82
 <211> 389
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 82
 Gln Phe Ile Asn Lys Cys Lys Lys Ile Asp Lys Met Ile Leu Leu Thr

1	5	10	15
Asn Gly Lys Asp Ala Phe Thr Asn Ile Ser Glu Ala Leu Met Ala Glu	20	25	30
Lys Leu Glu Glu Ile Phe Ser Gly Phe Gln Ile Ile Asp Lys Ile Phe	35	40	45
Lys Phe Lys Glu Ile Ile Ile Ile Ser Asn Lys Asp Lys Leu Lys	50	55	60
Lys Glu Phe Glu Lys Leu Ser Ile Phe Lys Asn Arg Lys Ile Lys Ile	65	70	75
Lys Ser Leu Glu Asn Ala Tyr Pro Tyr Thr Asn His Glu Met Ile Met	85	90	95
His Phe Leu Tyr Asn Asn Lys Asn Thr Lys Asp Asp Ile Asn Pro His	100	105	110
Asn Asn Ile Leu Leu Ala Asn Ile Glu Asp Leu Tyr Asn Ala Asn Leu	115	120	125
Val Ile Lys Asn Asn Asn Pro Tyr Lys Glu Lys Phe Val Ala Ile Asn	130	135	140
Gly Asn Lys Lys Ile Lys Ser Arg Ile Leu Lys Val Lys Ile Gly Thr	145	150	155
Ser Phe Ser Gln Leu Ile Asn Glu Lys Ile Asp Thr Lys Lys Tyr Glu	165	170	175
Ile Phe Leu Asn Asn Pro Ala Asn Lys Ile Lys Ile Asp Thr Leu Asn	180	185	190
Ile Pro Ile Thr Arg Asp Ile Tyr Ser Leu Thr Ile Leu Lys Lys Lys	195	200	205
Ser Ile Tyr Asp Lys Ile Lys Ala Leu Phe Ile Ser Ser Phe Ala Pro	210	215	220
Leu Gln Met Glu Asn Ile Ile Phe Ser Phe Leu Lys Lys Glu Lys Ile	225	230	235
Asn Asn Ser Gly Lys Leu Lys Ile Phe Asn Tyr Thr Asp Lys Glu Val	245	250	255
Glu Glu Glu Ile His Lys Val Gln Lys Glu Ile Lys Ser Lys Ile Leu	260	265	270
Asn Glu Ser Leu Thr Asn Glu Ala Ile Tyr Thr Glu Asn Asn Leu Lys	275	280	285
Asp Ile Tyr Phe Ala Ile Ile Leu Ser Leu Ser Pro Ser Leu Ile Phe	290	295	300
Ser Phe Leu Asn Asn Thr Lys Phe Met Thr Asp Thr Leu Leu Leu Ile			

305 310 315 320
 Phe Ile Ser Val Ala Ile Tyr Ile Pro Ile Met Leu Lys Ile Asn Tyr
 325 330 335
 Lys Cys Leu Ser Phe Phe Val Tyr Ala Ala Leu Met Ile Ser Ile Ile
 340 345 350
 Leu Pro Leu Asp Leu Glu Ile Thr Leu Lys Ile Ile Ser Leu Leu Phe
 355 360 365
 Thr Phe Leu Val Phe Phe Tyr Phe Phe Arg Leu Ser Ala Phe Leu Ala
 370 375 380
 Asn Pro Ile Leu Ile
 385

<210> 83
 <211> 2322
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 83
 atgctagact tagaaaaagt aaaaacaatt tttaaaaaat acaataaata cgaaataaat 60
 attaacgaga ttcaaatacc tgaatatgcc ctaataccccc ttgaaacaga aaattcaaaa 120
 tccataatat acataattga aaaacaaaaa atagaagaaa atcaaatttt atccaaaaac 180
 tcaaacatag agctatacac atattctcca atatctggaa tagtagaaaa aatatacaca 240
 gccaattttc cagatggaaa aaattttaaaa tcagcattaa tcaaatttca aggaaaaata 300
 aaaactgaaa aaacaccaat tgaagaagga gcctcaagag aaaaaacctt ggaaaaatta 360
 attcaactgg gaattccttg gtttaacgaa aattctttat ttcaattcat aaacaaatgt 420
 aaaaaaatag acaaaatgat tttattaaca aacggaaaag atgcatttac aaatatttca 480
 gaagcactga tggcagaaaa attagaagaa attttttcag gattccaaat aatcgacaaa 540
 atattcaaat tcaaagaaat aataataata atatcaaata aagacaaact aaaaaagaa 600
 ttcgaaaaat tgagtatttt taaaaacaga aaaataaaaa ttaaattctt agaaaatgca 660
 tatccttata caaatcacga aatgataatg cactttttat acaataataa aaatacaaaa 720
 gatgatataa atccccacaa caatatttta ttagcaaata ttgaagatct atacaatgca 780
 aatcttgtca taaaaataaa caacccttat aaagaaaaat ttgtagctat aaatggaaat 840
 aaaaaataaa aaagtagaat actgaaggta aaaattggaa cctctttcag ccagctaata 900
 aatgagaaaa ttgacacaaa aaaatatgaa atttttttta acaaccagc caataaaaata 960
 aaaatcgata cattaaacat accgataaca agagatatat atagtctcac catattaaag 1020
 aaaaagtcaa tatacgacaa aattaaagca ttgtttatat caagctttgc accattgcaa 1080
 atggaaaata ttattttttc attcttaaag aaagaaaaaa taaataatag cggcaaatta 1140
 aaaatattta attatacaga caaagaagta gaagaagaaa tacataaggt tcaaaaagaa 1200
 attaaaagca aaattctaaa tgaaagtcta acaaatgaag caatatacac tgaaaacaat 1260
 ttaaaaagaca tatactttgc tatcactata tcactatcac ctagcctgat attttctttc 1320
 ctaaataaca caaaattcat gacagacacc ttgctgttaa tttttattag tgtggcaatc 1380
 tatataccta taatgctaaa aattaattac aaatgtttgt ctttttttgt ttacgccgcc 1440
 ttaatgataa gcattatatt gcccttggat ttagaaatta cactaaaaat aatttcctta 1500
 ttattttact ttttggtatt cttttacttt ttcagactat cagcattttt ggcaaaccct 1560
 atattaattt cttttatggt ttttggtatta aattttccgg taagttttaa gcaagcctat 1620
 caagaggaac ttaaaaattc aaattcaata attccaacct ggaatgaaat aattgaaaca 1680
 aatccaaaca taaaaattt aaaaagttta aataccttta caagatatga aagtaaaaaa 1740
 atagatgcaa ttgaaaactt tgtaaatcaa aacatttttt ccgcttttaa tataattgtc 1800
 acaagatttc atattgaaag tcttttggga gttaataatg aaaaaaaaat atctcctatc 1860
 ttgctttatt ttggcctctt attaatagtt ggcaaatata taatcaacaa attaatacca 1920
 ctctcatatt atataagctt aatggcaatc tcgtacatag cacataatat aggaatgcta 1980

aaccacatca gctccgacat gttaacacta cttattttctc caatcccaat gctgttaata 2040
tttacaatgg caacagaatt gcaaataaca cctcacttta aatttgagca aatactctac 2100
ggatcaatat tggcatttat atactttttg acattaagct acattccttt tgaaacttta 2160
tcagtcataa tatctatttt catcttacaa acaagctcaa acttaataaa aaaatatagc 2220
ttaaccttca aaattaaaaa aataatgcat gttttgaaaa caaataaaga aaaagcactc 2280
aaaacacctc ttgagaatga aaaggatata ataaaattat ga 2322

<210> 84

<211> 773

<212> PRT

<213> *Borrelia burgdorferi*

<400> 84

Met Leu Asp Leu Glu Lys Val Lys Thr Ile Phe Lys Lys Tyr Asn Lys
1 5 10 15

Tyr Glu Ile Asn Ile Asn Glu Ile Gln Ile Pro Glu Tyr Ala Leu Ile
20 25 30

Pro Leu Glu Thr Glu Asn Ser Lys Ser Ile Ile Tyr Ile Ile Glu Lys
35 40 45

Gln Lys Ile Glu Glu Asn Gln Ile Leu Ser Lys Asn Ser Asn Ile Glu
50 55 60

Leu Tyr Thr Tyr Ser Pro Ile Ser Gly Ile Val Glu Lys Ile Tyr Thr
65 70 75 80

Ala Asn Phe Pro Asp Gly Lys Asn Leu Lys Ser Ala Leu Ile Lys Phe
85 90 95

Gln Gly Lys Ile Lys Thr Glu Lys Thr Pro Ile Glu Glu Gly Ala Ser
100 105 110

Arg Glu Lys Thr Leu Glu Lys Leu Ile Gln Leu Gly Ile Pro Trp Phe
115 120 125

Asn Glu Asn Ser Leu Phe Gln Phe Ile Asn Lys Cys Lys Lys Ile Asp
130 135 140

Lys Met Ile Leu Leu Thr Asn Gly Lys Asp Ala Phe Thr Asn Ile Ser
145 150 155 160

Glu Ala Leu Met Ala Glu Lys Leu Glu Glu Ile Phe Ser Gly Phe Gln
165 170 175

Ile Ile Asp Lys Ile Phe Lys Phe Lys Glu Ile Ile Ile Ile Ile Ser
180 185 190

Asn Lys Asp Lys Leu Lys Lys Glu Phe Glu Lys Leu Ser Ile Phe Lys
195 200 205

Asn Arg Lys Ile Lys Ile Lys Ser Leu Glu Asn Ala Tyr Pro Tyr Thr
210 215 220

Asn His Glu Met Ile Met His Phe Leu Tyr Asn Asn Lys Asn Thr Lys

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225		230		235		240
Asp Asp Ile Asn Pro His Asn Asn Ile Leu Leu Ala Asn Ile Glu Asp						
		245		250		255
Leu Tyr Asn Ala Asn Leu Val Ile Lys Asn Asn Asn Pro Tyr Lys Glu						
		260		265		270
Lys Phe Val Ala Ile Asn Gly Asn Lys Lys Ile Lys Ser Arg Ile Leu						
		275		280		285
Lys Val Lys Ile Gly Thr Ser Phe Ser Gln Leu Ile Asn Glu Lys Ile						
		290		295		300
Asp Thr Lys Lys Tyr Glu Ile Phe Leu Asn Asn Pro Ala Asn Lys Ile						
		305		310		315
Lys Ile Asp Thr Leu Asn Ile Pro Ile Thr Arg Asp Ile Tyr Ser Leu						
		325		330		335
Thr Ile Leu Lys Lys Lys Ser Ile Tyr Asp Lys Ile Lys Ala Leu Phe						
		340		345		350
Ile Ser Ser Phe Ala Pro Leu Gln Met Glu Asn Ile Ile Phe Ser Phe						
		355		360		365
Leu Lys Lys Glu Lys Ile Asn Asn Ser Gly Lys Leu Lys Ile Phe Asn						
		370		375		380
Tyr Thr Asp Lys Glu Val Glu Glu Glu Ile His Lys Val Gln Lys Glu						
		385		390		395
Ile Lys Ser Lys Ile Leu Asn Glu Ser Leu Thr Asn Glu Ala Ile Tyr						
		405		410		415
Thr Glu Asn Asn Leu Lys Asp Ile Tyr Phe Ala Ile Ile Leu Ser Leu						
		420		425		430
Ser Pro Ser Leu Ile Phe Ser Phe Leu Asn Asn Thr Lys Phe Met Thr						
		435		440		445
Asp Thr Leu Leu Leu Ile Phe Ile Ser Val Ala Ile Tyr Ile Pro Ile						
		450		455		460
Met Leu Lys Ile Asn Tyr Lys Cys Leu Ser Phe Phe Val Tyr Ala Ala						
		465		470		475
Leu Met Ile Ser Ile Ile Leu Pro Leu Asp Leu Glu Ile Thr Leu Lys						
		485		490		495
Ile Ile Ser Leu Leu Phe Thr Phe Leu Val Phe Phe Tyr Phe Phe Arg						
		500		505		510
Leu Ser Ala Phe Leu Ala Asn Pro Ile Leu Ile Ser Phe Met Phe Leu						
		515		520		525
Val Leu Asn Phe Pro Val Ser Phe Lys Gln Ala Tyr Gln Glu Glu Leu						

530		535		540
Lys Asn Ser Asn Ser	Ile Ile Pro Thr Trp	Asn Glu Ile Ile Glu Thr		
545	550	555	560	
Asn Pro Asn Ile Lys	Asn Leu Lys Ser	Leu Asn Thr Phe Thr Arg Tyr		
	565	570	575	
Glu Ser Lys Lys Ile	Asp Ala Ile Glu Asn Phe Val	Asn Gln Asn Ile		
	580	585	590	
Phe Ser Ala Phe Asn Ile	Ile Val Thr Arg Phe His	Ile Glu Ser Leu		
	595	600	605	
Leu Gly Val Asn Asn Glu	Lys Lys Ile Ser Pro	Ile Leu Leu Tyr Phe		
	610	615	620	
Gly Leu Leu Leu Ile	Val Gly Lys Tyr Ile	Ile Asn Lys Leu Ile Pro		
	625	630	635	640
Leu Ser Phe Tyr Ile	Ser Leu Met Ala Ile	Ser Tyr Ile Ala His Asn		
	645	650	655	
Ile Gly Met Leu Asn His	Ile Ser Ser Asp Met	Leu Thr Leu Leu Ile		
	660	665	670	
Ser Pro Ile Pro Met	Leu Leu Ile Phe Thr Met	Ala Thr Glu Leu Gln		
	675	680	685	
Ile Thr Pro His Phe	Lys Phe Glu Gln Ile	Leu Tyr Gly Ser Ile Leu		
	690	695	700	
Ala Phe Ile Tyr Phe	Leu Thr Leu Ser Tyr	Ile Pro Phe Glu Thr Leu		
	705	710	715	720
Ser Val Ile Ile Ser	Ile Phe Ile Leu Gln Thr	Ser Ser Asn Leu Ile		
	725	730	735	
Lys Lys Tyr Ser Leu	Thr Phe Lys Ile Lys Lys	Ile Met His Val Leu		
	740	745	750	
Lys Thr Asn Lys Glu	Lys Ala Leu Lys Thr	Pro Leu Glu Asn Glu Lys		
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Asp Ile Ile Lys Leu				
770				

<210> 85

<211> 704

<212> DNA

<213> *Borrelia burgdorferi*

<400> 85

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tatccacaac caagttgggt ggaacatgat cctacagaaa tatggggctc acaacttgga 180

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gttataacag aagctatggc aaatgcaaga attttgccca atgaaattga cgctattgga 240
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aatgcaatag tatggcaaga cagaagaact gcaaaaattt gtgaccaatt aaaaaaagaa 360
ggaaaagata aaattatatt ggaaaaaaca ggcttgggtgc tagattctta ttttagtgga 420
acaaaaataa tgtggatatt ggataatgta gaaggtgccca gacaaagagc cgaaaatggc 480
gaattatgct ttggaacaat agatacatgg atattgtgga acctgactca aaaaaaagaa 540
catgcaaccg attactctaa tgcttcaaga acattattat taaacattaa aacattagag 600
tgggatgatg aacttttaag catattaaat gttccaaggg caattttgcc tgaacttaaa 660
gaaagttcta caatatacgg caaaacagac aaagcactat ttgg 704

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<210> 86
 <211> 234
 <212> PRT
 <213> *Borrelia burgdorferi*

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<400> 86
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Ser Ser Arg Ala Met Val Phe Asp Lys Asn Ala Asn Ile Lys Gly Phe
          20                      25                      30

Ala Gln Lys Glu Phe Thr Gln Ile Tyr Pro Gln Pro Ser Trp Val Glu
          35                      40                      45

His Asp Pro Thr Glu Ile Trp Gly Ser Gln Leu Gly Val Ile Thr Glu
          50                      55                      60

Ala Met Ala Asn Ala Arg Ile Leu Pro Asn Glu Ile Asp Ala Ile Gly
          65                      70                      75                      80

Ile Thr Asn Gln Arg Glu Thr Thr Val Ile Trp Glu Lys Asn Thr Gly
          85                      90                      95

Lys Pro Ile Tyr Asn Ala Ile Val Trp Gln Asp Arg Arg Thr Ala Lys
          100                     105                     110

Ile Cys Asp Gln Leu Lys Lys Glu Gly Lys Asp Lys Ile Ile Leu Glu
          115                     120                     125

Lys Thr Gly Leu Val Leu Asp Ser Tyr Phe Ser Gly Thr Lys Ile Met
          130                     135                     140

Trp Ile Leu Asp Asn Val Glu Gly Ala Arg Gln Arg Ala Glu Asn Gly
          145                     150                     155                     160

Glu Leu Cys Phe Gly Thr Ile Asp Thr Trp Ile Leu Trp Asn Leu Thr
          165                     170                     175

Gln Lys Lys Glu His Ala Thr Asp Tyr Ser Asn Ala Ser Arg Thr Leu
          180                     185                     190

Leu Leu Asn Ile Lys Thr Leu Glu Trp Asp Asp Glu Leu Leu Ser Ile
          195                     200                     205

Leu Asn Val Pro Arg Ala Ile Leu Pro Glu Leu Lys Glu Ser Ser Thr

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210

215

220

Ile Tyr Gly Lys Thr Asp Lys Ala Leu Phe
225 230

<210> 87

<211> 1506

<212> DNA

<213> *Borrelia burgdorferi*

<400> 87

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gctatggcaa atgcaagaat tttgccaat gaaattgacg ctattggaat aactaatcaa 240
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ggaacaatag atacatggat attgtggaac ctgactcaaa aaaaagaaca tgcaaccgat 540
tactctaatz cttcaagaac attattatta aacattaaaa cattagagtg ggatgatgaa 600
cttttaagca tattaaatgt tccaagggca attttgcttg aacttaaga aagttctaca 660
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<210> 88

<211> 449

<212> PRT

<213> *Borrelia burgdorferi*

<400> 88

Met Lys Tyr Ile Leu Ser Ile Asp Gln Gly Thr Thr Ser Ser Arg Ala
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Met Val Phe Asp Lys Asn Ala Asn Ile Lys Gly Phe Ala Gln Lys Glu
20 25 30

Phe Thr Gln Ile Tyr Pro Gln Pro Ser Trp Val Glu His Asp Pro Thr
35 40 45

Glu Ile Trp Gly Ser Gln Leu Gly Val Ile Thr Glu Ala Met Ala Asn
50 55 60

25348199.1

Ala	Arg	Ile	Leu	Pro	Asn	Glu	Ile	Asp	Ala	Ile	Gly	Ile	Thr	Asn	Gln	65	70	75	80
Arg	Glu	Thr	Thr	Val	Ile	Trp	Glu	Lys	Asn	Thr	Gly	Lys	Pro	Ile	Tyr	85	90	95	
Asn	Ala	Ile	Val	Trp	Gln	Asp	Arg	Arg	Thr	Ala	Lys	Ile	Cys	Asp	Gln	100	105	110	
Leu	Lys	Lys	Glu	Gly	Lys	Asp	Lys	Ile	Ile	Leu	Glu	Lys	Thr	Gly	Leu	115	120	125	
Val	Leu	Asp	Ser	Tyr	Phe	Ser	Gly	Thr	Lys	Ile	Met	Trp	Ile	Leu	Asp	130	135	140	
Asn	Val	Glu	Gly	Ala	Arg	Gln	Arg	Ala	Glu	Asn	Gly	Glu	Leu	Cys	Phe	145	150	155	160
Gly	Thr	Ile	Asp	Thr	Trp	Ile	Leu	Trp	Asn	Leu	Thr	Gln	Lys	Lys	Glu	165	170	175	
His	Ala	Thr	Asp	Tyr	Ser	Asn	Ala	Ser	Arg	Thr	Leu	Leu	Leu	Asn	Ile	180	185	190	
Lys	Thr	Leu	Glu	Trp	Asp	Asp	Glu	Leu	Leu	Ser	Ile	Leu	Asn	Val	Pro	195	200	205	
Arg	Ala	Ile	Leu	Pro	Glu	Leu	Lys	Glu	Ser	Ser	Thr	Ile	Tyr	Gly	Lys	210	215	220	
Thr	Asp	Lys	Ala	Leu	Phe	Gly	Ala	Glu	Ile	Pro	Ile	Ala	Gly	Ile	Ala	225	230	235	240
Gly	Asp	Gln	Phe	Ala	Ala	Thr	Phe	Gly	Gln	Ala	Cys	Leu	Lys	Lys	Gly	245	250	255	
Met	Ala	Lys	Asn	Thr	Tyr	Gly	Thr	Gly	Cys	Phe	Leu	Thr	Val	Asn	Ile	260	265	270	
Gly	Lys	Glu	Pro	Ile	Ile	Ser	His	Asp	Lys	Leu	Leu	Thr	Ser	Ile	Ala	275	280	285	
Trp	Gly	Arg	Lys	Lys	Ser	Val	Thr	Tyr	Val	Leu	Glu	Gly	Ser	Val	Phe	290	295	300	
Ile	Gly	Gly	Ala	Val	Ile	Gln	Trp	Leu	Arg	Asp	Gly	Leu	Glu	Phe	Phe	305	310	315	320
Arg	Lys	Ser	Ser	Asp	Ala	Glu	Ala	Leu	Ala	Ser	Ser	Val	Ser	Asp	Asn	325	330	335	
Gly	Gly	Val	Tyr	Phe	Val	Pro	Ala	Phe	Val	Gly	Leu	Gly	Ala	Pro	His	340	345	350	
Trp	Asp	Ser	Tyr	Ala	Arg	Gly	Thr	Ile	Ile	Gly	Ile	Thr	Arg	Gly	Ser	355	360	365	

Thr Lys Ala His Ile Thr Arg Ala Ala Leu Glu Ser Ile Ala Phe Gln
 370 375 380
 Ser Phe Asp Ile Leu Asn Thr Met Lys Lys Ser Ile Pro Asn Phe Glu
 385 390 395 400
 Ile Gln Glu Leu Arg Val Asp Gly Gly Ala Ser Gln Asn Asn Leu Leu
 405 410 415
 Met Gln Phe Gln Ala Asp Leu Leu Glu Cys Lys Val Val Arg Pro Lys
 420 425 430
 Ile Thr Glu Thr Thr Ala Leu Gly Ala Ala Tyr Leu Ala Gly Leu Ala
 435 440 445

Thr

<210> 89
 <211> 311
 <212> DNA
 <213> *Borrelia burgdorferi*

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 aaaattatga gcactacggg gtatatattt tgcgaacttt tagtttattt gagaacatat 180
 actatattatt ttgttaaaaa agatcttaat gatattatta atttacttat tattaaagga 240
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<210> 90
 <211> 103
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 90
 Gln Ile Lys Val Leu Gln Lys Asn Asn Lys Ser Lys Ile Leu Ala Glu
 1 5 10 15
 Gln Leu Phe Pro Gly Ile Ser Phe Leu Asn Leu Asp Asn Tyr Asn Glu
 20 25 30
 Lys Met Asn Glu Lys Ile Val Ser Lys Ile Met Ser Thr Thr Gly Tyr
 35 40 45
 Ile Tyr Cys Glu Leu Leu Val Tyr Leu Arg Thr Tyr Thr Ile Tyr Phe
 50 55 60
 Val Lys Lys Asp Leu Asn Asp Ile Ile Asn Leu Leu Ile Ile Lys Gly
 65 70 75 80
 Gln Trp Lys Leu Ile Glu Leu Ser Arg Glu Met Ser Asn Asp Met His
 85 90 95

Ala Leu Ile Asn Ile Tyr Ala
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<210> 91
<211> 1569
<212> DNA
<213> *Borrelia burgdorferi*

<400> 91
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aatttttata aaattttttc tcccttaagg ccatttgcac aaagatataa aaatttcta 240
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aataaagaag attttcctat taagtctaata gtatggatta aggttatttc ttctattttg 720
gatataaata agagtaaaga aattttatat ctaataagat atgttagtgg ggatccagat 780
tatttcccta tttctgttgg gcaaaaaccc aatccaatag caagaatgtt ttttaatgat 840
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aaaaatattt tgggtagttt agctttattt ttaaagttaa tggatttata tttggagaaa 1560
aaatcttaa 1569

<210> 92
<211> 522
<212> PRT
<213> *Borrelia burgdorferi*

<400> 92
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Asn Lys Glu Leu Thr Ser Glu Gln Ile Lys Gln Lys Arg Leu Lys Glu
20 25 30
Val Lys Val Ser Leu Gly Arg Val Ser Asn Phe Phe Asn Ala Ser Lys
35 40 45
Ile Gln Ala Leu Pro Gln Phe Ser Arg Phe Leu Tyr Asn Phe Tyr Lys
50 55 60

Ile	Phe	Ser	Pro	Leu	Arg	Pro	Phe	Ala	Gln	Arg	Tyr	Lys	Asn	Ser	Asn	65	70	75	80
Lys	Ile	Val	His	Phe	Val	Val	Glu	Lys	Tyr	Leu	Asn	Glu	Asn	Gln	Lys	85	90	95	
Lys	Ser	Leu	Asp	Tyr	Ile	Tyr	Ser	Phe	Ser	Ala	Ser	Asp	Asn	Ile	Asn	100	105	110	
Phe	Ala	Ser	Asp	Leu	Pro	Lys	Asn	Leu	His	Asn	Asn	Leu	Ser	Tyr	Leu	115	120	125	
Phe	Lys	Asn	Ile	Thr	Gln	Glu	Gln	Ile	Lys	Leu	Ile	Asp	Glu	Thr	Tyr	130	135	140	
Glu	Ala	Leu	His	Asn	Phe	Phe	Asp	Leu	Val	Leu	Tyr	Gln	Tyr	His	Leu	145	150	155	160
Val	Leu	Lys	Asn	Phe	Asp	Asn	Leu	Leu	Pro	Glu	Asp	Asp	Phe	Val	Tyr	165	170	175	
Arg	Pro	Arg	Phe	Ser	Ser	Ile	Gly	Cys	Gly	Val	Ile	Ile	Asp	Asp	Leu	180	185	190	
Lys	Asp	Leu	Leu	Glu	Cys	Ile	Ser	Cys	Ile	Lys	Asn	Ile	Ser	Ile	Trp	195	200	205	
Lys	Asn	Leu	Tyr	Asp	Ile	Ile	Leu	Glu	Ile	Tyr	Gly	Asn	Lys	Glu	Asp	210	215	220	
Phe	Pro	Ile	Lys	Ser	Asn	Val	Trp	Ile	Lys	Val	Ile	Ser	Ser	Ile	Leu	225	230	235	240
Asp	Ile	Asn	Lys	Ser	Lys	Glu	Ile	Leu	Tyr	Leu	Ile	Arg	Tyr	Val	Ser	245	250	255	
Gly	Asp	Pro	Asp	Tyr	Phe	Pro	Ile	Ser	Val	Gly	Gln	Lys	Pro	Asn	Pro	260	265	270	
Ile	Ala	Arg	Met	Phe	Phe	Asn	Asp	Leu	Thr	Lys	His	Val	Ala	Thr	Glu	275	280	285	
Ile	Glu	Lys	Ile	Lys	Val	Leu	Gln	Lys	Asn	Asn	Lys	Ser	Lys	Ile	Leu	290	295	300	
Ala	Glu	Gln	Leu	Phe	Pro	Gly	Ile	Ser	Phe	Leu	Asn	Leu	Asp	Asn	Tyr	305	310	315	320
Asn	Glu	Lys	Met	Asn	Glu	Lys	Ile	Val	Ser	Lys	Ile	Met	Ser	Thr	Thr	325	330	335	
Gly	Tyr	Ile	Tyr	Cys	Glu	Leu	Leu	Val	Tyr	Leu	Arg	Thr	Tyr	Thr	Ile	340	345	350	
Tyr	Phe	Val	Lys	Lys	Asp	Leu	Asn	Asp	Ile	Ile	Asn	Leu	Leu	Ile	Ile	355	360	365	

Lys Gly Gln Trp Lys Leu Ile Glu Leu Ser Arg Glu Met Ser Asn Asp
 370 375 380
 Met His Ala Leu Ile Asn Ile Tyr Ala Ser Leu Ile Asp Phe Asp Ser
 385 390 395 400
 Asn Leu Gly Glu Gln Gly Gly Tyr Gly Asn Arg Ile Asn Ala Leu Leu
 405 410 415
 His Arg Ala Ser Leu Gly Asp Lys Ser Ser Glu Lys Leu Leu Leu Asn
 420 425 430
 Ile Ile Ala Asp Val Asn Lys Lys Ala Phe Ala Ile Ser Ser Glu Tyr
 435 440 445
 Tyr Ser Lys Ile Tyr Ser Ile Glu Gln Arg Leu Gln Asp Cys Leu Ser
 450 455 460
 Asp Tyr Ser Lys Val Ser Leu Glu Arg Glu Leu Ile Tyr Asn Trp Lys
 465 470 475 480
 Glu Leu Asp Met Asp Leu Ala Lys Ser Tyr Gly Asn Asn Leu Asn Phe
 485 490 495
 Gly Gly Met Met Lys Asn Ile Leu Gly Ser Leu Ala Leu Phe Leu Lys
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 Leu Met Asp Leu Tyr Leu Glu Lys Lys Ser
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<210> 93
 <211> 699
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 93
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 aatgaaaaag tttacagaat tacgcttgat tctcagcttt ttaatgttgc tatgaaaaaa 180
 ataattgaaa aatatacctaa aataaaaaagt gcaagttttg catttaattc gttaattaac 240
 taaaaaaata ttttaaaaagc tagcagttta aaaccactag ctttttaaat taattataaa 300
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 ccaccgctat ttttaaaatg taagccaata tttggatcta ctagtttttc ttttaataag 600
 tttgttaaaa atgttagtgt ttctttttcc gtgttgttta agtttaaatct gcttactaat 660
 ttttctaaag gtgttgatc tgggtaccacg cgtatcgat 699

<210> 94
 <211> 80
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 94

His Pro Phe Gly Ser Ser Asp Ala Lys Lys Val Ile Glu Ala Phe Ala
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Ser Leu Tyr Asn Asn Gly Thr Trp Ser Asp Met Ile Ala Glu Ile Thr
20 25 30
Ile Lys Ser Lys Gln Tyr Pro Lys Asn Glu Lys Val Tyr Arg Ile Thr
35 40 45
Leu Asp Ser Gln Leu Phe Asn Val Ala Met Lys Lys Ile Ile Glu Lys
50 55 60
Tyr Pro Lys Ile Lys Ser Ala Ser Phe Ala Phe Asn Ser Leu Ile Asn
65 70 75 80

<210> 95

<211> 849

<212> DNA

<213> *Borrelia burgdorferi*

<400> 95

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gtagtttatg atttgcaaaa ttatgaaact ttaaaagctc ttgaaaataa aaataaattt 240
attgattact ctaaaataga gtttttagaa ggaacaaaat caataaatgc ttttatttgg 300
gcagtttctg ttcgttggat aaaaattaaa gccagagatt tgtttgggga gtgtggagat 360
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accgcatatc cttttggttc tagcgatgct aaaaaagtga ttgaagcttt tgcttctctt 660
tataataatg gaacttggag tgatatgatt gccgagatta ctattaagtc aaagcaatat 720
ccaaaaaatg aaaaagttta cagaattacg cttgattctc agctttttta tgttgctatg 780
aaaaaaataa ttgaaaaata tcctaaaata aaaagtgcaa gttttgcatt taattcgta 840
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<210> 96

<211> 282

<212> PRT

<213> *Borrelia burgdorferi*

<400> 96

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20 25 30
Arg Glu Ser Gly Ser Asp Arg Arg Gly Gln Glu Asn Arg Ala Leu Gly
35 40 45

Ala Met Asn Phe Gly Leu Phe Ser Gly Asp Ser Gly Val Val Tyr Asp
 50 55 60
 Leu Gln Asn Tyr Glu Thr Leu Lys Ala Leu Glu Asn Lys Asn Lys Phe
 65 70 75 80
 Ile Asp Tyr Ser Lys Ile Glu Phe Leu Glu Gly Thr Lys Ser Ile Asn
 85 90 95
 Ala Phe Ile Trp Ala Val Ser Val Arg Trp Ile Lys Ile Lys Ala Arg
 100 105 110
 Asp Leu Phe Gly Glu Cys Gly Asp Phe Ile Lys Glu Leu Lys Gly Ile
 115 120 125
 Lys Tyr Ser Tyr Leu Val Ser Pro Val Asp Gly Ser Tyr Ile Ser Tyr
 130 135 140
 Ala Met Pro Ile Ile Val Phe Glu Thr Thr Arg Glu Ser Asp Pro Leu
 145 150 155 160
 Tyr Ser Val Ser Gly Phe Lys Leu Ile Ser Lys Gly Asn Asp Ile Asn
 165 170 175
 Phe Asn Glu Asn Lys Ser Gly Phe Trp Gly Arg Leu Pro Met Ser Glu
 180 185 190
 Lys Ser Val Glu Ser Gly Leu Val Thr Ala Tyr Pro Phe Gly Ser Ser
 195 200 205
 Asp Ala Lys Lys Val Ile Glu Ala Phe Ala Ser Leu Tyr Asn Asn Gly
 210 215 220
 Thr Trp Ser Asp Met Ile Ala Glu Ile Thr Ile Lys Ser Lys Gln Tyr
 225 230 235 240
 Pro Lys Asn Glu Lys Val Tyr Arg Ile Thr Leu Asp Ser Gln Leu Phe
 245 250 255
 Asn Val Ala Met Lys Lys Ile Ile Glu Lys Tyr Pro Lys Ile Lys Ser
 260 265 270
 Ala Ser Phe Ala Phe Asn Ser Leu Ile Asn
 275 280

<210> 97

<211> 321

<212> DNA

<213> *Borrelia burgdorferi*

<400> 97

cacactgccc ttccagaatc aatttattta agcaaattgg tggacaaggt ttatcttatt 60
 gtaagaaaaa ataatcttag agctattgct atgttaagag atagtgttgc taagttacct 120
 aatattgaaa ttttgataaa ttcagaagcc atagaagtag atggtaaadc ttctgtttct 180
 tcgggttaaga tttttaataa aaaagataat gttgtttatg aattagaagt gagtgtctga 240

tttatggctg ttggctataa gccaaataca gaatttttaa agggattttt ggatttggac 300
gaaggcaatc gtttttaatt g 321

<210> 98
<211> 105
<212> PRT
<213> *Borrelia burgdorferi*

<400> 98
His Thr Ala Leu Ser Glu Ser Ile Tyr Leu Ser Lys Leu Val Asp Lys
1 5 10 15
Val Tyr Leu Ile Val Arg Lys Asn Asn Leu Arg Ala Ile Ala Met Leu
20 25 30
Arg Asp Ser Val Ala Lys Leu Pro Asn Ile Glu Ile Leu Tyr Asn Ser
35 40 45
Glu Ala Ile Glu Val Asp Gly Lys Ser Ser Val Ser Ser Val Lys Ile
50 55 60
Phe Asn Lys Lys Asp Asn Val Val Tyr Glu Leu Glu Val Ser Ala Val
65 70 75 80
Phe Met Ala Val Gly Tyr Lys Pro Asn Thr Glu Phe Leu Lys Gly Phe
85 90 95
Leu Asp Leu Asp Glu Gly Asn Arg Phe
100 105

<210> 99
<211> 981
<212> DNA
<213> *Borrelia burgdorferi*

<400> 99
atgttggaaat ttgaaactat tgatataaat ctaaccaaga agaaaaatct atctcaaaaa 60
gaggtagatt ttattgaaga tgtaataatt gtaggatctg gcccggtctg actaacagct 120
gggatttatt ctgttatgag taattataag gctgctatct tggaagggtcc tgaacccggg 180
ggacagctta ctacaaccac agaagtttac aattatcctg gctttaaaaa tgaataaagt 240
ggtagaaatt tgatgttaaa tatgaggagg caagtagtaa atcttggggc taaaactttt 300
cccgaaccg ttttttctat aaaaaggaag ggtaatatct tttaccttta tacagaaaat 360
tatatttata aaagtaaagc tgttattatt gctgtgggat caaaaccaa aaaacttgaa 420
actcttaaaa attcgggttt attttggaat aaaggatatt ctgtttgtgc tatttgtgat 480
ggacatcttt ttaaaggga aagggttgca gtaattggtg gaggcaacac tgccctttca 540
gaatcaattt atttaagcaa attggtggac aagggttatc ttattgtaag aaaaaataat 600
cttagagcta ttgctatgtt aagagatagt gttgctaagt tacctaatat tgaaattttg 660
tataattcag aagccataga agtagatggt aaatcttctg tttcttcggt taagattttt 720
aataaaaaag ataattgtgt ttatgaatta gaagtgaagt ctgtatttat ggctgttggc 780
tataagccaa atacagaatt tttaaaggga tttttggatt tggacgaaga gggatttatt 840
gtcactaaag atgttgtaa aacaagcgtt gatggtgttt tttcatgtgg agatgttagc 900
aataaacttt atgctcaagc cattactgct gctgctgagg gggtttattgc atctgttagc 960
ttaggaaatt ttttaaaata g 981

<210> 100
 <211> 326
 <212> PRT
 <213> Borrelia burgdorferi

<400> 100

Met	Leu	Glu	Phe	Glu	Thr	Ile	Asp	Ile	Asn	Leu	Thr	Lys	Lys	Lys	Asn
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Leu	Ser	Gln	Lys	Glu	Val	Asp	Phe	Ile	Glu	Asp	Val	Ile	Ile	Val	Gly
		20						25					30		
Ser	Gly	Pro	Ala	Gly	Leu	Thr	Ala	Gly	Ile	Tyr	Ser	Val	Met	Ser	Asn
		35					40					45			
Tyr	Lys	Ala	Ala	Ile	Leu	Glu	Gly	Pro	Glu	Pro	Gly	Gly	Gln	Leu	Thr
	50					55					60				
Thr	Thr	Thr	Glu	Val	Tyr	Asn	Tyr	Pro	Gly	Phe	Lys	Asn	Gly	Ile	Ser
	65					70				75					80
Gly	Arg	Asn	Leu	Met	Leu	Asn	Met	Arg	Glu	Gln	Val	Val	Asn	Leu	Gly
				85					90					95	
Ala	Lys	Thr	Phe	Pro	Glu	Thr	Val	Phe	Ser	Ile	Lys	Arg	Lys	Gly	Asn
			100					105					110		
Ile	Phe	Tyr	Leu	Tyr	Thr	Glu	Asn	Tyr	Ile	Tyr	Lys	Ser	Lys	Ala	Val
		115					120					125			
Ile	Ile	Ala	Val	Gly	Ser	Lys	Pro	Lys	Lys	Leu	Glu	Thr	Leu	Lys	Asn
	130					135					140				
Ser	Gly	Leu	Phe	Trp	Asn	Lys	Gly	Ile	Ser	Val	Cys	Ala	Ile	Cys	Asp
145					150					155					160
Gly	His	Leu	Phe	Lys	Gly	Lys	Arg	Val	Ala	Val	Ile	Gly	Gly	Gly	Asn
				165					170					175	
Thr	Ala	Leu	Ser	Glu	Ser	Ile	Tyr	Leu	Ser	Lys	Leu	Val	Asp	Lys	Val
			180					185					190		
Tyr	Leu	Ile	Val	Arg	Lys	Asn	Asn	Leu	Arg	Ala	Ile	Ala	Met	Leu	Arg
	195						200					205			
Asp	Ser	Val	Ala	Lys	Leu	Pro	Asn	Ile	Glu	Ile	Leu	Tyr	Asn	Ser	Glu
	210					215					220				
Ala	Ile	Glu	Val	Asp	Gly	Lys	Ser	Ser	Val	Ser	Ser	Val	Lys	Ile	Phe
225					230					235					240
Asn	Lys	Lys	Asp	Asn	Val	Val	Tyr	Glu	Leu	Glu	Val	Ser	Ala	Val	Phe
				245					250					255	
Met	Ala	Val	Gly	Tyr	Lys	Pro	Asn	Thr	Glu	Phe	Leu	Lys	Gly	Phe	Leu
			260					265					270		

Asp Leu Asp Glu Glu Gly Phe Ile Val Thr Lys Asp Val Val Lys Thr
 275 280 285

Ser Val Asp Gly Val Phe Ser Cys Gly Asp Val Ser Asn Lys Leu Tyr
 290 295 300

Ala Gln Ala Ile Thr Ala Ala Ala Glu Gly Phe Ile Ala Ser Val Glu
 305 310 315 320

Leu Gly Asn Phe Leu Lys
 325

<210> 101
 <211> 225
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 101
 catatgatata tatatcaaaa tcaattaaaa tttttaaaat tggttggtatt ttttttatta 60
 atatcttgca cttccttaaa cggtgagcac gatcaatttg gaaaaacatt tagaatatac 120
 caaagcttaa ataaaaatgc agaacttaag ggtattttta attataaaaac aggaataact 180
 aaaatagtat tatacacaag gtttagaaac catagtataa cagaa 225

<210> 102
 <211> 75
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 102
 His Met Ile Leu Tyr Gln Asn Gln Leu Lys Phe Leu Lys Leu Leu Val
 1 5 10 15
 Phe Phe Leu Leu Ile Ser Cys Thr Ser Leu Asn Val Glu His Asp Gln
 20 25 30
 Phe Gly Lys Thr Phe Arg Ile Tyr Gln Ser Leu Asn Lys Asn Ala Glu
 35 40 45
 Leu Lys Gly Ile Phe Asn Tyr Lys Thr Gly Ile Thr Lys Ile Val Leu
 50 55 60
 Tyr Thr Arg Phe Arg Asn His Ser Ile Thr Glu
 65 70 75

<210> 103
 <211> 498
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 103
 atgatattat atcaaaatca attaaaattt ttaaaattgt tggtattttt tttattaata 60
 tcttgactt ccttaaactg tgagcacgat caatttgga aaacatttag aatataccaa 120
 agcttaaata aaaatgcaga acttaagggt atttttaatt ataaaacagg aataactaaa 180
 atagtattat acacaagggt tagaaacat agtataacag aacagaatcc tttattgctg 240

ctggatggaa ctaaaattga gggaaaagta agctacaaaa gagataataa ccattttttt 300
 ggcaactgga ttaattattc atcatttggt ttgaccaa at ctttattgga aaggatgatt 360
 aaagaagaag atgcttctta taagaataag gaggttaaaa ttagaattgg attagaagat 420
 ttaagcttga aaaaatataa aattttggac tttctagtaa tggttgaatc gattgaaaat 480
 aaagattata aaagttaa 498

<210> 104

<211> 165

<212> PRT

<213> *Borrelia burgdorferi*

<400> 104

Met Ile Leu Tyr Gln Asn Gln Leu Lys Phe Leu Lys Leu Leu Val Phe

1 5 10 15

Phe Leu Leu Ile Ser Cys Thr Ser Leu Asn Val Glu His Asp Gln Phe

20 25 30

Gly Lys Thr Phe Arg Ile Tyr Gln Ser Leu Asn Lys Asn Ala Glu Leu

35 40 45

Lys Gly Ile Phe Asn Tyr Lys Thr Gly Ile Thr Lys Ile Val Leu Tyr

50 55 60

Thr Arg Phe Arg Asn His Ser Ile Thr Glu Gln Asn Pro Leu Leu Leu

65 70 75 80

Leu Asp Gly Thr Lys Ile Glu Gly Lys Val Ser Tyr Lys Arg Asp Asn

85 90 95

Asn His Phe Phe Gly Asn Trp Ile Asn Tyr Ser Ser Phe Val Leu Thr

100 105 110

Lys Ser Leu Leu Glu Arg Met Ile Lys Glu Glu Asp Ala Ser Tyr Lys

115 120 125

Asn Lys Glu Val Lys Ile Arg Ile Gly Leu Glu Asp Leu Ser Leu Lys

130 135 140

Lys Tyr Lys Ile Leu Asp Phe Leu Val Met Val Glu Ser Ile Glu Asn

145 150 155 160

Lys Asp Tyr Lys Ser

165

<210> 105

<211> 896

<212> DNA

<213> *Borrelia burgdorferi*

<400> 105

cttgatgtgc ttagtgatgg ttatgggttt ttgagaactg catcaaattc ttatctttct 60

ggaggcaatg atgtttacgt ttctccctct cagattagac tttttaattt aaggacaggt 120

gatattttat atggccaaat tagatcgctt agagatgggtg agagattttt tgcaatgggt 180

aaaattaaat ctattaatga tcaagatcct acgtttgctc aaaacagaat accttttgat 240

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aatttaactc ctctttatcc caatgtgaaa ttgaatcttg aatatgaaaa ttgcaatatt 300
tctacaaggc ttattaatct tttttcacct ataggtaagg ggcaaagggc tttaatagtt 360
tctcctccaa aagcgggaaa gactaccctg cttcaaaaaa tagctaatagc aataactact 420
aattattcag atgttatttt aatgatacta cttattgatg agaggccaga agaagttaca 480
gatatgattc gtagcgtaa aggcgaagta attgcatcta attttgatga gcaggctagt 540
aggcatgttc aggtagcaga gatgggttatt gaaaaggcta aaaggccttg tgaaaacaaa 600
aaagatgttg ttattttgct tgattctatt acaaggcctg caagggcata taatcaaact 660
atgccaaactt ctggtaaaat tttatcgggt ggggtagatt ctaatgctct tcataagcca 720
aagaggtttt ttgggtctgc tagaaatata gaagaagggg gaagtttaac tattatagct 780
actgctttgg ttgatactgg tagtaaaatg gatgaagtta tttttgaaga atttaaaagt 840
accggttaata tggaattaat tcttgataga agtttggcag acagaagact ttttcc 896

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<210> 106

<211> 298

<212> PRT

<213> *Borrelia burgdorferi*

<400> 106

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Leu Asp Val Leu Ser Asp Gly Tyr Gly Phe Leu Arg Thr Ala Ser Asn
 1              5              10              15

```

```

Ser Tyr Leu Ser Gly Gly Asn Asp Val Tyr Val Ser Pro Ser Gln Ile
          20              25              30

```

```

Arg Leu Phe Asn Leu Arg Thr Gly Asp Ile Leu Tyr Gly Gln Ile Arg
          35              40              45

```

```

Ser Pro Arg Asp Gly Glu Arg Phe Phe Ala Met Val Lys Ile Lys Ser
          50              55              60

```

```

Ile Asn Asp Gln Asp Pro Thr Phe Ala Gln Asn Arg Ile Pro Phe Asp
          65              70              75              80

```

```

Asn Leu Thr Pro Leu Tyr Pro Asn Val Lys Leu Asn Leu Glu Tyr Glu
          85              90              95

```

```

Asn Cys Asn Ile Ser Thr Arg Leu Ile Asn Leu Phe Ser Pro Ile Gly
          100              105              110

```

```

Lys Gly Gln Arg Ala Leu Ile Val Ser Pro Pro Lys Ala Gly Lys Thr
          115              120              125

```

```

Thr Leu Leu Gln Lys Ile Ala Asn Ala Ile Thr Thr Asn Tyr Ser Asp
          130              135              140

```

```

Val Ile Leu Met Ile Leu Leu Ile Asp Glu Arg Pro Glu Glu Val Thr
          145              150              155              160

```

```

Asp Met Ile Arg Ser Val Lys Gly Glu Val Ile Ala Ser Asn Phe Asp
          165              170              175

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```

Glu Gln Ala Ser Arg His Val Gln Val Ala Glu Met Val Ile Glu Lys
          180              185              190

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```

Ala Lys Arg Leu Val Glu Asn Lys Lys Asp Val Val Ile Leu Leu Asp
          195              200              205

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25348199.1

Ser Ile Thr Arg Leu Ala Arg Ala Tyr Asn Gln Thr Met Pro Thr Ser
 210 215 220
 Gly Lys Ile Leu Ser Gly Gly Val Asp Ser Asn Ala Leu His Lys Pro
 225 230 235 240
 Lys Arg Phe Phe Gly Ser Ala Arg Asn Ile Glu Glu Gly Gly Ser Leu
 245 250 255
 Thr Ile Ile Ala Thr Ala Leu Val Asp Thr Gly Ser Lys Met Asp Glu
 260 265 270
 Val Ile Phe Glu Glu Phe Lys Ser Thr Gly Asn Met Glu Leu Ile Leu
 275 280 285
 Asp Arg Ser Leu Ala Asp Arg Arg Leu Phe
 290 295

<210> 107
 <211> 1548
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 107
 atggataaaa aaaatggtgg atttgattta gaaagtga aaagcggtt ggatgtttct 60
 aaagagttaa agattgaaga taatttgaaa aaaaaagtgg ttaaagtgt tgctaaaaag 120
 gattctgcat ctacgtgac aaaatctgca gatttaagt gcgtaaagga ttcaaacggg 180
 gtaatatatt ctgattttga ttatgatatt cttcttcag gtttagaaaa taatattaaa 240
 acttttagagc aaagtaatat catcaaattt tttaattgga aagattatgt agagattgaa 300
 aaactttatg ataagccaat tacagagggt agaaaaattg ttgaaggctt tgggaccaat 360
 catactattg ctgtaacaat gaaaaaaacc gaattaatat ttttattggt gaaaatatta 420
 agtgagaata atattgatgt tttattttaca ggtgtgcttg atgtgcttag tgatggttat 480
 gggtttttga gaactgcatc aaattcttat cttctggag gcaatgatgt ttacgtttct 540
 ccctctcaga ttagactttt taatttaagg acagggtgata ttttatatgg ccaaattaga 600
 tcgcctagag atgggtgagag attttttgca atgggttaaaa ttaaactctat taatgatcaa 660
 gatcctacgt ttgctcaaaa cagaatacct tttgataatt taactcctct ttatcccaat 720
 gtgaaattga atcttgaata tgaaaattgc aatattttcta caaggcttat taatcttttt 780
 tcacctatag gtaaggggca aagggtctta atagtttctc ctccaaaagc gggaaagact 840
 accctgcttc aaaaaatagc taatgcaata actactaatt attcagatgt tattttaatg 900
 atactactta ttgatgagag gccagaagaa gttacagata tgattcgtag cgtaaaggc 960
 gaagtaattg catctaattt tgatgagcag gctagtaggc atgttcaggt agcagagatg 1020
 gttattgaaa aggctaaaag gcttggtgaa aacaaaaaag atgttggtat tttgcttgat 1080
 tctattacaa ggcttgcaag ggcataatat caaactatgc caacttctgg taaaatttta 1140
 tcgggtgggg tagattctaa tgctcttcat aagccaaaga ggttttttgg gctcgctaga 1200
 aatatagaag aagggggaag tttaactatt atagctactg ctttggttga tactggtagt 1260
 aaaatggatg aagttatttt tgaagaattt aaaagtaccg gtaatatgga attaattctt 1320
 gatagaagtt tggcagacag aagacttttt cctgctatta atattaaaaa gtcaggtagc 1380
 agaaaagaag aattgcttct tagtgaagag gagcgttcta agattttgct tattagaaga 1440
 atacttgag gtgttgatga ttatgagga gttgaagttc tgatagaaaa gatgaaaaaa 1500
 agcaaaaaca atgaaatttt cttgaagaca atgagcaatg gtaattga 1548

<210> 108
 <211> 515
 <212> PRT

<213> Borrelia burgdorferi

<400> 108

Met	Asp	Lys	Lys	Asn	Gly	Gly	Phe	Asp	Leu	Glu	Ser	Glu	Ile	Arg	Arg
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Leu	Asp	Val	Ser	Lys	Glu	Phe	Lys	Ile	Glu	Asp	Asn	Leu	Lys	Lys	Lys
			20					25					30		
Val	Val	Lys	Val	Val	Ala	Lys	Lys	Asp	Ser	Ala	Ser	Ser	Val	Thr	Lys
		35					40					45			
Ser	Ala	Asp	Leu	Ser	Gly	Val	Lys	Asp	Ser	Asn	Gly	Val	Ile	Phe	Ser
	50					55					60				
Asp	Phe	Asp	Tyr	Asp	Ile	Pro	Ser	Ser	Gly	Leu	Glu	Asn	Asn	Ile	Lys
65					70					75					80
Thr	Leu	Glu	Gln	Ser	Asn	Ile	Ile	Lys	Phe	Phe	Asn	Gly	Lys	Asp	Tyr
				85					90					95	
Val	Glu	Ile	Glu	Lys	Leu	Tyr	Asp	Lys	Pro	Ile	Thr	Glu	Val	Arg	Lys
			100					105					110		
Ile	Val	Glu	Gly	Leu	Gly	Thr	Asn	His	Thr	Ile	Ala	Val	Thr	Met	Lys
		115					120					125			
Lys	Thr	Glu	Leu	Ile	Phe	Leu	Leu	Val	Lys	Ile	Leu	Ser	Glu	Asn	Asn
	130					135					140				
Ile	Asp	Val	Leu	Phe	Thr	Gly	Val	Leu	Asp	Val	Leu	Ser	Asp	Gly	Tyr
145					150					155					160
Gly	Phe	Leu	Arg	Thr	Ala	Ser	Asn	Ser	Tyr	Leu	Ser	Gly	Gly	Asn	Asp
				165					170					175	
Val	Tyr	Val	Ser	Pro	Ser	Gln	Ile	Arg	Leu	Phe	Asn	Leu	Arg	Thr	Gly
			180					185					190		
Asp	Ile	Leu	Tyr	Gly	Gln	Ile	Arg	Ser	Pro	Arg	Asp	Gly	Glu	Arg	Phe
	195						200					205			
Phe	Ala	Met	Val	Lys	Ile	Lys	Ser	Ile	Asn	Asp	Gln	Asp	Pro	Thr	Phe
	210					215					220				
Ala	Gln	Asn	Arg	Ile	Pro	Phe	Asp	Asn	Leu	Thr	Pro	Leu	Tyr	Pro	Asn
225					230					235					240
Val	Lys	Leu	Asn	Leu	Glu	Tyr	Glu	Asn	Cys	Asn	Ile	Ser	Thr	Arg	Leu
			245						250					255	
Ile	Asn	Leu	Phe	Ser	Pro	Ile	Gly	Lys	Gly	Gln	Arg	Ala	Leu	Ile	Val
		260						265					270		
Ser	Pro	Pro	Lys	Ala	Gly	Lys	Thr	Thr	Leu	Leu	Gln	Lys	Ile	Ala	Asn
		275					280					285			

Ala Ile Thr Thr Asn Tyr Ser Asp Val Ile Leu Met Ile Leu Leu Ile
290 295 300

Asp Glu Arg Pro Glu Glu Val Thr Asp Met Ile Arg Ser Val Lys Gly
305 310 315 320

Glu Val Ile Ala Ser Asn Phe Asp Glu Gln Ala Ser Arg His Val Gln
325 330 335

Val Ala Glu Met Val Ile Glu Lys Ala Lys Arg Leu Val Glu Asn Lys
340 345 350

Lys Asp Val Val Ile Leu Leu Asp Ser Ile Thr Arg Leu Ala Arg Ala
355 360 365

Tyr Asn Gln Thr Met Pro Thr Ser Gly Lys Ile Leu Ser Gly Gly Val
370 375 380

Asp Ser Asn Ala Leu His Lys Pro Lys Arg Phe Phe Gly Ser Ala Arg
385 390 395 400

Asn Ile Glu Glu Gly Gly Ser Leu Thr Ile Ile Ala Thr Ala Leu Val
405 410 415

Asp Thr Gly Ser Lys Met Asp Glu Val Ile Phe Glu Glu Phe Lys Ser
420 425 430

Thr Gly Asn Met Glu Leu Ile Leu Asp Arg Ser Leu Ala Asp Arg Arg
435 440 445

Leu Phe Pro Ala Ile Asn Ile Lys Lys Ser Gly Thr Arg Lys Glu Glu
450 455 460

Leu Leu Leu Ser Glu Glu Glu Arg Ser Lys Ile Leu Leu Ile Arg Arg
465 470 475 480

Ile Leu Gly Gly Val Asp Asp Tyr Glu Gly Val Glu Val Leu Ile Glu
485 490 495

Lys Met Lys Lys Ser Lys Asn Asn Glu Ile Phe Leu Lys Thr Met Ser
500 505 510

Asn Gly Asn
515

<210> 109

<211> 318

<212> DNA

<213> *Borrelia burgdorferi*

<400> 109

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aatccgattg ctgctgctat tgggaagggt aatggggatg gtgcggagtt tgatcaggat 120
gagatgaaga aggatgatca gattgctgct gctattgctt tgagggggat ggctaaggat 180
ggaaagtttg ctgtgaagg taataatgag aaagagaagg ctgagggggc tattaaagaa 240
gttagcgagt tgttggataa gctggtaaca gctgtaaaga cagctgaggg ggcttcaagt 300

ggtactgatg caattgga

318

<210> 110
<211> 106
<212> PRT
<213> *Borrelia burgdorferi*

<400> 110
Pro Ile Val Lys Ala Ala Gly Glu Ala Glu Gln Asp Gly Glu Lys Pro
1 5 10 15
Glu Asp Ala Lys Asn Pro Ile Ala Ala Ala Ile Gly Lys Gly Asn Gly
20 25 30
Asp Gly Ala Glu Phe Asp Gln Asp Glu Met Lys Lys Asp Asp Gln Ile
35 40 45
Ala Ala Ala Ile Ala Leu Arg Gly Met Ala Lys Asp Gly Lys Phe Ala
50 55 60
Val Lys Gly Asn Asn Glu Lys Glu Lys Ala Glu Gly Ala Ile Lys Glu
65 70 75 80
Val Ser Glu Leu Leu Asp Lys Leu Val Thr Ala Val Lys Thr Ala Glu
85 90 95
Gly Ala Ser Ser Gly Thr Asp Ala Ile Gly
100 105

<210> 111
<211> 507
<212> DNA
<213> *Borrelia burgdorferi*

<400> 111
gaggggggcta ttaagggagc tgctgcaatt ggagaagttg tggataatgc tgggtgctgcg 60
aaggctgctg ataaggatag tgtgaagggg attgctaagg ggataaagga gattgttgaa 120
gctgctgggg ggagtgaana gctgaaagct gctgctgctg aaggggagaa taataaaaag 180
gcaggaagt tgtttgggaa agttgatggt gctgctgggg acagtgaggc tgctagcaag 240
gcggtggtg ctgttagtgc tgtagtggtg gagcagatat taagtgcgat tgtaaggct 300
gctggtgagg ctgagcagga tggagagaag cctgaggatg ctaaaaatcc gattgctgct 360
gctattggga agggtaatgg ggatggtgctg gagtttgatc aggatgagat gaagaaggat 420
gatcagattg ctgctgctat tgctttgagg gggatggcta aggatggaaa gtttgctgtg 480
aagggtaata atgagaaaga gaaggct 507

<210> 112
<211> 169
<212> PRT
<213> *Borrelia burgdorferi*

<400> 112
Glu Gly Ala Ile Lys Gly Ala Ala Ala Ile Gly Glu Val Val Asp Asn
1 5 10 15

Ala Gly Ala Ala Lys Ala Ala Asp Lys Asp Ser Val Lys Gly Ile Ala
20 25 30

Lys Gly Ile Lys Glu Ile Val Glu Ala Ala Gly Gly Ser Glu Lys Leu
35 40 45

Lys Ala Ala Ala Ala Glu Gly Glu Asn Asn Lys Lys Ala Gly Lys Leu
50 55 60

Phe Gly Lys Val Asp Gly Ala Ala Gly Asp Ser Glu Ala Ala Ser Lys
65 70 75 80

Ala Ala Gly Ala Val Ser Ala Val Ser Gly Glu Gln Ile Leu Ser Ala
85 90 95

Ile Val Lys Ala Ala Gly Glu Ala Glu Gln Asp Gly Glu Lys Pro Glu
100 105 110

Asp Ala Lys Asn Pro Ile Ala Ala Ala Ile Gly Lys Gly Asn Gly Asp
115 120 125

Gly Ala Glu Phe Asp Gln Asp Glu Met Lys Lys Asp Asp Gln Ile Ala
130 135 140

Ala Ala Ile Ala Leu Arg Gly Met Ala Lys Asp Gly Lys Phe Ala Val
145 150 155 160

Lys Gly Asn Asn Glu Lys Glu Lys Ala
165

<210> 113
<211> 558
<212> DNA
<213> *Borrelia burgdorferi*

<400> 113
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gctgaggggg cttcaagtgg tactgatgca attggagaag ttgtggataa tgatgctaag 120
gttgctgata aggcgagtg gacggggatt gctaagggga taaaggagat tggtgaagct 180
gctaggggga gtgaaaagct gaaagttgct gctgctaaag agggcaatga aaaggcaggg 240
aagttgtttg ggaaggctgg tgctaattgct catggggaca gtgaggctgc tagcaaggcg 300
gctggtgctg ttagtgctgt tagtggggag cagatattaa gtgcgattgt taaggctgct 360
gatgcggctg agcaggatgg aaagaagcct gcagatgcta caaatccgat tgctgctgct 420
attgggaata aagatgagga tgcggatttt ggtgatggga tgaagaagga tgatcagatt 480
gctgctgcta ttgctttgag ggggatggct aaggatggaa agtttgctgt gaagggtaat 540
aatgagaaag ggaaggct 558

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<213> *Borrelia burgdorferi*

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 tagagctatt gttggagaat ctggaagcgg aaaatccgta acaagtatgg ctatttttaa 720
 attattacca gaacttaca cagtatataa aagtggagaa atactatttg aaaatcaaga 780
 tctgctaaaa cttagcgaaa aagaactttt aaaaatcaga gggaataaaa tatcaatgat 840
 atttcaagac ccaatgactt cattaaaccc atttttaaga atatcaactc aacttgaaga 900
 aacaataatc ttacaccaag gattagggaa aaaaga 936

<210> 119
 <211> 95
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 119
 Arg Asn Asp Val Phe Gly Val Gln Ile Ala Ala Ala Leu Lys Asn Val
 1 5 10 15
 Phe Ala Ile Ala Phe Gly Ile Leu Asp Ala Tyr Lys Leu Asn Tyr Pro
 20 25 30
 Asn Leu Ile Gly Asn Asn Thr Glu Ser Phe Leu Phe Ser Ile Ser Leu
 35 40 45
 Asn Asn Ile Lys Asp Ile Ala Met Glu Leu Gly Gly Arg Asn Ile Glu
 50 55 60
 Thr Phe Leu Phe Leu Ser Gly Ser Gly Asp Leu Asp Val Thr Cys Arg
 65 70 75 80
 Ser Met Phe Gly Arg Asn Arg Arg Phe Gly Leu Ile Ala Leu Glu
 85 90 95

<210> 120
 <211> 1092
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 120
 atgagttttt ataaggttat agggggagta tttatgaaaa tatcagtaat aggggcaggt 60
 gcttggggaa cagctatttc aaagtctttg gcagataaat ttgattttta tattttttta 120

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tgggtctttg aagaagatgt taagaatgat attaataatg ataatgttaa tactaaatat 180
ttaaagggaa ttaaattgcc aaaaaattta gttgcaagtt cagattttatt tgaagttgta 240
acaatgtctg attatatttt cattgcaaca ctttctcttt ttaccgttga tatttttaaaa 300
aaattggatc aattttttaca ttttctggag ataaaaccaa agctagcaat acttacaaaa 360
gggtttatta cttttgatgg taaaactcag acagttattg aagctgctga gagaattatg 420
aaaggatata aagacgaaat tacttatatt gttggtccaa gtcatgctga ggaagttggg 480
cttgggtgta taacagggct tgttgccgct agtaataaca gagaaaatgc atatttgttt 540
attaatttat ttagtaaaac cccaatttct ttattttata gcaacgatgt ttttgggggtg 600
caaatagcag cagctttaa aaatgtgttt gctattgcat ttggaatttt ggatgcctat 660
aaattgaatt atcctaattt aataggtaat aatacagaat catttttatt ttcaatatcc 720
ttaaataata taaaagatat tgcaatggag cttgggggaa gaaatattga aacgttttta 780
ttttgtctg gttctggcga tttagatggt acttgtagaa gcatgttttg aagaaataga 840
cgatttggca atgaaattgt tagcaaaaac atttttagaaa gctttttaag tatagatgac 900
ttgataagta atattgaaaa aattggatat ttaccagagg gagttttggc tgctaaatca 960
atttttttct tttttaaaca attaaatcgt gatctcaatc ctaatagttt gttaagcgtt 1020
atatataaaa ttttgaataa agagttggag cccaaatctg ttattgagta tatgagagat 1080
gttagacaat aa 1092

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<210> 121
 <211> 363
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 121

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Met Ser Phe Tyr Lys Val Ile Gly Gly Val Phe Met Lys Ile Ser Val
  1              5              10              15

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Ile Gly Ala Gly Ala Trp Gly Thr Ala Ile Ser Lys Ser Leu Ala Asp
      20              25              30

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Lys Phe Asp Phe Asn Ile Phe Leu Trp Val Phe Glu Glu Asp Val Lys
      35              40              45

```

```

Asn Asp Ile Asn Asn Asp Asn Val Asn Thr Lys Tyr Leu Lys Gly Ile
      50              55              60

```

```

Lys Leu Pro Lys Asn Leu Val Ala Ser Ser Asp Leu Phe Glu Val Val
      65              70              75              80

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```

Thr Met Ser Asp Tyr Ile Phe Ile Ala Thr Pro Ser Leu Phe Thr Val
      85              90              95

```

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Asp Ile Leu Lys Lys Leu Asp Gln Phe Leu His Phe Leu Glu Ile Lys
      100             105             110

```

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Pro Lys Leu Ala Ile Leu Thr Lys Gly Phe Ile Thr Phe Asp Gly Lys
      115             120             125

```

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Thr Gln Thr Val Ile Glu Ala Ala Glu Arg Ile Met Lys Gly Tyr Lys
      130             135             140

```

```

Asp Glu Ile Thr Tyr Ile Val Gly Pro Ser His Ala Glu Glu Val Gly
      145             150             155             160

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Leu Gly Val Ile Thr Gly Leu Val Ala Ala Ser Asn Asn Arg Glu Asn
      165             170             175

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Ala Tyr Leu Phe Ile Asn Leu Phe Ser Lys Thr Pro Ile Ser Leu Phe
180 185 190

Tyr Ser Asn Asp Val Phe Gly Val Gln Ile Ala Ala Ala Leu Lys Asn
195 200 205

Val Phe Ala Ile Ala Phe Gly Ile Leu Asp Ala Tyr Lys Leu Asn Tyr
210 215 220

Pro Asn Leu Ile Gly Asn Asn Thr Glu Ser Phe Leu Phe Ser Ile Ser
225 230 235 240

Leu Asn Asn Ile Lys Asp Ile Ala Met Glu Leu Gly Gly Arg Asn Ile
245 250 255

Glu Thr Phe Leu Phe Leu Ser Gly Ser Gly Asp Leu Asp Val Thr Cys
260 265 270

Arg Ser Met Phe Gly Arg Asn Arg Arg Phe Gly Asn Glu Ile Val Ser
275 280 285

Lys Asn Ile Leu Glu Ser Phe Leu Ser Ile Asp Asp Leu Ile Ser Asn
290 295 300

Ile Glu Lys Ile Gly Tyr Leu Pro Glu Gly Val Leu Ala Ala Lys Ser
305 310 315 320

Ile Phe Phe Phe Phe Lys Gln Leu Asn Arg Asp Leu Asn Pro Asn Ser
325 330 335

Leu Leu Ser Val Ile Tyr Lys Ile Leu Asn Lys Glu Leu Glu Pro Lys
340 345 350

Ser Val Ile Glu Tyr Met Arg Asp Val Arg Gln
355 360

<210> 122

<211> 211

<212> DNA

<213> *Borrelia burgdorferi*

<400> 122

cttaaaattt caagggcacc tatttcgttt ggatttgttt ttaataggga aattgctctt 60
tcgattaatt ttgcggttct ctcacatctt tttttgattt tccctatatt tttacctatt 120
gtaagtttta atgctatttt aaaaaataaa aacactaaaa taaatactgt caatgaagag 180
attactataa atagtgacaa cactcgtatt g 211

<210> 123

<211> 70

<212> PRT

<213> *Borrelia burgdorferi*

<400> 123

Leu Lys Ile Ser Arg Ala Pro Ile Ser Phe Gly Phe Val Phe Asn Arg

1 5 10 15
 Glu Ile Ala Leu Ser Ile Asn Phe Arg Val Leu Ser Ser Ser Phe Leu
 20 25 30
 Ile Phe Pro Ile Phe Leu Pro Ile Val Ser Phe Asn Ala Ile Leu Lys
 35 40 45
 Asn Lys Asn Thr Lys Ile Asn Thr Val Asn Glu Glu Ile Thr Ile Asn
 50 55 60
 Ser Asp Asn Thr Arg Ile
 65 70

<210> 124
 <211> 727
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 124
 cgaattaatt tttttatttt atttttttat aataaaataa gtccagcatt agtaattata 60
 cttagtggat ttttttatac attaatataa atatgattaa acaaaaatta aaaatatctc 120
 aaaattttaa ctcaattcaa atacaaacaa taaaaatatt aagccttaac caaaaagaat 180
 taacaaagct tatactagaa gaaagcgaaa ataatgaatg tctagaaata aactcaaata 240
 aaatattttt tgaaacattg aaaacatata gggtttaaaa agttttttat aaagaagatg 300
 atatgataaa aaatcaacac gacatagctc ttgaaaaaac acaaacaaat acttctttaa 360
 aagaacacct tttactgcaa ttaagaattc aaagaataaa tgaagatgaa attaaaatag 420
 gcgaaatact cataaacaat ctaaacagca aagggttttca tataataaac ccttacgatc 480
 tttttaaaaa ggaagaaaaa gaaaaagtaa aaaaaataat tgaacttatt caaaaatttg 540
 atccaattgg aatttgtgtc cccaacataa tagaatcggt aattttgcaa gcaaagcatc 600
 ataaattaga aactaatatt attaaaattc ttgaaaaagc agagcttctt gaaaaaactc 660
 aaaaaaagtt aaaagaggaa cttaaataa gaagcaaaga atttaacacg gctttagaaa 720
 ttatcag 727

<210> 125
 <211> 29
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 125
 Arg Ile Asn Phe Phe Ile Leu Phe Phe Tyr Asn Lys Ile Ser Pro Ala
 1 5 10 15
 Leu Val Ile Ile Leu Ser Gly Phe Phe Tyr Thr Leu Ile
 20 25

<210> 126
 <211> 534
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 126
 ttgatttttaa taaatttatt cattacattc ttaaaaatcg gattattaaa tttcggaggc 60
 ggtaatggaa ttgcagcaat aataaacaac gaaataatta ataataaaca ttggataaca 120

aaagaagaat ttgtcaatat gattacaata tcaagaataa cccctggggcc tattgcaaca 180
 aacatagcaa catacgttgg aatgaaaact gcaggaattg cgggagcaat aattgctaca 240
 gtagcattaa taacagcccc aataataata atgattataa tcctcctaact actacataaa 300
 atcggttttt taaattattg cctagaaaat ctaaaaccta ttattgttgc gctgtggata 360
 attacaataa tcatttttgc tgaaaataca tattttaaaaa tagaaaacaa caaaacagaa 420
 cttttgaaaa ctctggctat tgtaggaatt aattttttta ttttattttt ttataataaa 480
 ataagtccag cattagtaat tatacttagt ggattttttt atacattaat ataa 534

<210> 127

<211> 177

<212> PRT

<213> *Borrelia burgdorferi*

<400> 127

Met Ile Leu Ile Asn Leu Phe Ile Thr Phe Leu Lys Ile Gly Leu Leu
 1 5 10 15

Asn Phe Gly Gly Gly Asn Gly Ile Ala Ala Ile Ile Asn Asn Glu Ile
 20 25 30

Ile Asn Asn Lys His Trp Ile Thr Lys Glu Glu Phe Val Asn Met Ile
 35 40 45

Thr Ile Ser Arg Ile Thr Pro Gly Pro Ile Ala Thr Asn Ile Ala Thr
 50 55 60

Tyr Val Gly Met Lys Thr Ala Gly Ile Ala Gly Ala Ile Ile Ala Thr
 65 70 75 80

Val Ala Leu Ile Thr Ala Pro Ile Ile Ile Met Ile Ile Ile Leu Leu
 85 90 95

Ile Leu His Lys Ile Gly Phe Leu Asn Tyr Cys Leu Glu Asn Leu Lys
 100 105 110

Pro Ile Ile Val Ala Leu Trp Ile Ile Thr Ile Ile Ile Leu Leu Glu
 115 120 125

Asn Thr Tyr Leu Lys Ile Glu Asn Asn Lys Thr Glu Leu Leu Lys Thr
 130 135 140

Leu Ala Ile Val Gly Ile Asn Phe Phe Ile Leu Phe Phe Tyr Asn Lys
 145 150 155 160

Ile Ser Pro Ala Leu Val Ile Ile Leu Ser Gly Phe Phe Tyr Thr Leu
 165 170 175

Ile

<210> 128

<211> 213

<212> DNA

<213> *Borrelia burgdorferi*

<400> 128
cctagtaata tatcaacaat gaaaaaatac ttaaatacaat tagaaaaaga aataaaaaatc 60
atagcaaaat tctatttttaa aaacgatcaa tctctaattt attgcaaact taattataacc 120
ctagaaaaaaa tttgttttaa actaataaaa ttctacaaaa aattctacaa agaattaaaa 180
caatttacac aaaagaacat tactacttaa ttg 213

<210> 129
<211> 69
<212> PRT
<213> *Borrelia burgdorferi*

<400> 129
Pro Ser Asn Ile Ser Thr Met Lys Lys Tyr Leu Asn Gln Leu Glu Lys
1 5 10 15
Glu Ile Lys Ile Ile Ala Lys Phe Tyr Phe Lys Asn Asp Gln Ser Leu
20 25 30
Ile Tyr Cys Lys Leu Asn Tyr Thr Leu Glu Lys Ile Cys Leu Lys Leu
35 40 45
Ile Lys Phe Tyr Lys Lys Phe Tyr Lys Glu Leu Lys Gln Phe Thr Gln
50 55 60
Lys Asn Ile Thr Thr
65

<210> 130
<211> 444
<212> DNA
<213> *Borrelia burgdorferi*

<400> 130
ttgggaaatt atcaatactt ttttaattta ttctttattt tcaaaataat ctttatatac 60
ttatatatta tgtataaggc tataaaagaa caacaagaaa tagaaataga tcatgcatgc 120
agaatactta ttcttaccgc aacaatattt gaaataaatt caatattcga aaattattat 180
caaaaaactc tactcaaaaa gtataacgaa aatctcaaaa acaaaaatct acctcctagt 240
aatatatcaa caatgaaaaa atacttaaat caattagaaa aagaaataaa aatcatagca 300
aaattctatt ttaaaaacga tcaatctcta atttattgca aacttaatta taccctagaa 360
aaaatttggt taaaactaat aaaattctac aaaaaattct acaaagaatt aaaacaattt 420
acacaaaaga acattactac ttaa 444

<210> 131
<211> 147
<212> PRT
<213> *Borrelia burgdorferi*

<400> 131
Met Gly Asn Tyr Gln Tyr Phe Phe Asn Leu Phe Phe Ile Phe Lys Ile
1 5 10 15
Ile Phe Ile Tyr Leu Tyr Ile Met Tyr Lys Ala Ile Lys Glu Gln Gln
20 25 30

Glu Ile Glu Ile Asp His Ala Cys Arg Ile Leu Ile Leu Thr Ala Thr
 35 40 45
 Ile Phe Glu Ile Asn Ser Ile Phe Glu Asn Tyr Tyr Gln Lys Thr Leu
 50 55 60
 Leu Lys Lys Tyr Asn Glu Asn Leu Lys Asn Lys Asn Leu Pro Pro Ser
 65 70 75 80
 Asn Ile Ser Thr Met Lys Lys Tyr Leu Asn Gln Leu Glu Lys Glu Ile
 85 90 95
 Lys Ile Ile Ala Lys Phe Tyr Phe Lys Asn Asp Gln Ser Leu Ile Tyr
 100 105 110
 Cys Lys Leu Asn Tyr Thr Leu Glu Lys Ile Cys Leu Lys Leu Ile Lys
 115 120 125
 Phe Tyr Lys Lys Phe Tyr Lys Glu Leu Lys Gln Phe Thr Gln Lys Asn
 130 135 140
 Ile Thr Thr
 145

<210> 132
 <211> 921
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 132
 cacataaaaag aaatagacct aggtatttat caacagtatg taaattagtt gcttgatgct 60
 aaaaaatcga tattaggaga gtttaatgtc taatgttact accatagaga aattagatag 120
 tattttacaa gaagataagt ggacaagaat agttgttaat aattattctc ttgccaaaat 180
 aaaagaattg gatgatttaa taaataatat aattgatgag gggttaacag aggatgtgct 240
 tgatatttgt ggcaggcatt taaaggacgt taaaaaaagc atagcaggtc tttatatttc 300
 tggaatgctt atatatagta ggcgaccttt aaatgatatg aatttacttg ctgttattga 360
 tttgttttct caaaatttaa aatgggctct tgttgagcat atatgtaatg aaatgctttt 420
 aatttctgag aataagcacg ctctttatac tcttgcaaaa atatatgctc agaacaatga 480
 aaatgataag cttccaggta tttggactag aattggttgaa gcagatattg acgacactgt 540
 gtttgttagg caacttgcta cttattatga aactattgat ttgcaaaaaat caatttttcta 600
 ttttagaaaa gctattttatc gttttattga taaaaaacia atgtcaggaa tcagagaagt 660
 atgggccaag cttattcatt atgtttcaga tgattttgat tcttttttgc ttatttttga 720
 aaaaattgaa aaagatcttg gatttaaaaa ggccatagtt ctttatgagg atttatttga 780
 tcattattct ttgactgaca atgttgacga gacaatagaa attttaaaag gcatttttaa 840
 acttgataac aaaaatcata aggcaagaga aaatttagtt aaatttttaa gagaaagata 900
 taaagatggt aaaaatattg a 921

<210> 133
 <211> 15
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 133
 His Ile Lys Glu Ile Asp Leu Gly Ile Tyr Gln Gln Tyr Val Asn
 1 5 10 15

<210> 134
 <211> 1005
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 134
 gtgtcatcag aaagaatcgt tgaattgatt aaagagattt atttagattt tagaaaaggc 60
 aatttcaaag aagcttttagt aaaatccgaa gaggctcatt ctcttgattt tgataatatt 120
 gaaattctaa cagcttttagt aaaatccgaa gaggctcatt ctcttgattt tgataatatt 180
 gaaattctaa cagctttgaa aagttctgtg tattggaatg gtcaagttga aagccttgat 240
 agaatagggc aagattatga aaaggcagaa tttttaataa gagagtggaa taattttgca 300
 ggacgatatt tgaaaaagat gggttgtaat tttttgcaag gtcgcaattc tataaaatat 360
 tttgtgtttc agacctgtct ttatatatat aaaaatatat acaaaatgca tccagaaaat 420
 ttggaccttt taataaaaat tgctaagtct tataagggta tgggaaatta cgagagagca 480
 atcaatgttt ttttgcaaat attaggagat tttaaagata actcagatgt tgttgcagag 540
 cttgctgatt cttatgcgtt ggttgatgaa attaaagaag cttaaagtatt attcagagag 600
 gcttttttta ttaatcctca aaagatagat atatattctc ttgagtctga tatgatttta 660
 agattaatag atcttattaa gtctgacaga aatatttcag atgatcttat aaaagaatgg 720
 attcctgttt atggctctct taatgggtgtt tttaatatta aaagagaggt aaggcctata 780
 gagcttggac agctaaagca gtctgtttac agtttgcgca atgagcttaa agaaaagtct 840
 tatagatcaa taaatgagag catattgctt ccaaggctta ttaataaata tttttggctt 900
 attgatcatt atgtaaggat aaaagaagat agagcacgta ttgatgagat tttgttatac 960
 ataaaagaaa tagacctagg tatttatcaa cagtatgtaa attag 1005

<210> 135
 <211> 314
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 135
 Met Ser Ser Glu Arg Ile Val Glu Leu Ile Lys Glu Ile Tyr Leu Asp
 1 5 10 15
 Phe Arg Lys Gly Asn Phe Lys Glu Ala Leu Val Lys Ser Glu Glu Ala
 20 25 30
 His Ser Leu Asp Phe Asp Asn Ile Glu Ile Leu Thr Ala Leu Lys Ser
 35 40 45
 Ser Val Tyr Trp Asn Gly Gln Val Glu Ser Leu Asp Arg Ile Gly Gln
 50 55 60
 Asp Tyr Glu Lys Ala Glu Phe Leu Ile Arg Glu Trp Asn Asn Phe Ala
 65 70 75 80
 Gly Arg Tyr Leu Lys Lys Met Gly Cys Asn Phe Leu Gln Gly Arg Asn
 85 90 95
 Ser Ile Lys Tyr Phe Val Phe Gln Thr Cys Leu Tyr Ile Tyr Lys Asn
 100 105 110
 Ile Tyr Lys Met His Pro Glu Asn Leu Asp Leu Leu Ile Lys Ile Ala
 115 120 125

Lys Ser Tyr Lys Gly Met Gly Asn Tyr Glu Arg Ala Ile Asn Val Phe
 130 135 140
 Leu Gln Ile Leu Gly Asp Phe Lys Asp Asn Ser Asp Val Val Ala Glu
 145 150 155 160
 Leu Ala Asp Ser Tyr Ala Leu Val Asp Glu Ile Lys Glu Ala Lys Val
 165 170 175
 Leu Phe Arg Glu Ala Phe Phe Ile Asn Pro Gln Lys Ile Asp Ile Tyr
 180 185 190
 Ser Leu Glu Ser Asp Met Ile Leu Arg Leu Ile Asp Leu Ile Lys Ser
 195 200 205
 Asp Arg Asn Ile Ser Asp Asp Leu Ile Lys Glu Trp Ile Pro Val Tyr
 210 215 220
 Gly Ser Leu Asn Gly Val Phe Asn Ile Lys Arg Glu Leu Arg Pro Ile
 225 230 235 240
 Glu Leu Gly Gln Leu Lys Gln Ser Val Tyr Ser Leu Arg Asn Glu Leu
 245 250 255
 Lys Glu Lys Ser Tyr Arg Ser Ile Asn Glu Ser Ile Leu Leu Pro Arg
 260 265 270
 Leu Ile Asn Lys Tyr Phe Trp Leu Ile Asp His Tyr Val Arg Ile Lys
 275 280 285
 Glu Asp Arg Ala Arg Ile Asp Glu Ile Leu Leu Tyr Ile Lys Glu Ile
 290 295 300
 Asp Leu Gly Ile Tyr Gln Gln Tyr Val Asn
 305 310

<210> 136

<211> 307

<212> DNA

<213> *Borrelia burgdorferi*

<400> 136

ctattttattg tttttgaagt ttactctaag ccagctttta taagtcaaga cgattcgtat 60
 gagcttgatt ttagtagtgg agaggtagat attagtgtaa ataccaattc aaaatttaaat 120
 ctttctttta aagatgagtc ttggatttat atcaaaagca ttgaaaatga agcttttatt 180
 aagttaattg gagaatctta tgataacggt gctgttttta cttttcagac ttttaaaaaa 240
 gaaggcaaaa ttaaattggg tttcacttat caaaatgtta aagattcaag tgaatttaaat 300
 aaaataa 307

<210> 137

<211> 102

<212> PRT

<213> *Borrelia burgdorferi*

<400> 137

Leu Phe Ile Val Phe Glu Val Tyr Ser Lys Pro Ala Phe Ile Ser Gln
 1 5 10 15
 Asp Asp Ser Tyr Glu Leu Asp Phe Ser Ser Gly Glu Val Asp Ile Ser
 20 25 30
 Val Asn Thr Asn Ser Lys Phe Asn Leu Ser Phe Lys Asp Glu Ser Trp
 35 40 45
 Ile Tyr Ile Lys Ser Ile Glu Asn Glu Ala Phe Ile Lys Leu Ile Gly
 50 55 60
 Glu Ser Tyr Asp Asn Gly Ala Val Phe Thr Phe Gln Thr Phe Lys Lys
 65 70 75 80
 Glu Gly Lys Ile Lys Leu Val Phe Thr Tyr Gln Asn Val Lys Asp Ser
 85 90 95
 Ser Glu Phe Asn Lys Ile
 100

<210> 138
 <211> 1041
 <212> DNA
 <213> *Borrelia burgdorferi*

<400> 138
 atgattagaa aatatttgat ttatataagt ttgctattta ttgtttttga agtttactct 60
 aagccagctt ttataagtca agacgattcg tatgagcttg attttagtag tggagaggta 120
 gatattagtg taaataccaa ttcaaaatctt aatctttctt ttaaagatga gtcttggatt 180
 tatatcaaaa gcattgaaaa tgaagctttt attaagttaa ttggagaatc ttatgataac 240
 ggtgctgttt ttacttttca gactttttaa aaagaaggca aaattaaatt ggtttttact 300
 tatcaaaatg ttaaagattc aagtgaattt aataaaataa ttatcttgaa aattacaaag 360
 aattttgaag ttgcaattcc acaaggcgtt ggtggtggct ctagcaggga caataacatt 420
 gaaactggta ataactctga acttgggggg gggagtatta gcggggcaac ttctaaagag 480
 attattgtta gggcttttaa tttgtcctac ataaatgatt acaaaggagc aatagatttg 540
 cttaataagt ataatttcaa tgacgataaa tatattttat tgaaggcgga aattcattat 600
 aaaaatggtg attattttaa atcttatgaa aattatttga aattgaagag taaatatttt 660
 caaagcattg tttttgatct aattaggctt gctatagaat taaatattaa agaagagggt 720
 ttagagaacg ctagatattt agttgaaaag aatggttgatt tttctgagag catttatctt 780
 gagatctttg aattcttagt aacaagggga gagcatgagt ttgcttttaa ttttagctct 840
 ctttactttc ctaagtatat taattcaagc ttttcagaca aatatagtta tttgttggga 900
 aaactttatg agtctgagag caagcataaa gattttttta aggctttgca ttactataaa 960
 ttggttattg ataattacc ttttagttat tattatgaga gagccaagat aagatattta 1020
 tttttaagc ggttttttta g 1041

<210> 139
 <211> 346
 <212> PRT
 <213> *Borrelia burgdorferi*

<400> 139
 Met Ile Arg Lys Tyr Leu Ile Tyr Ile Ser Leu Leu Phe Ile Val Phe
 1 5 10 15

Glu Val Tyr Ser Lys Pro Ala Phe Ile Ser Gln Asp Asp Ser Tyr Glu
 20 25 30
 Leu Asp Phe Ser Ser Gly Glu Val Asp Ile Ser Val Asn Thr Asn Ser
 35 40 45
 Lys Phe Asn Leu Ser Phe Lys Asp Glu Ser Trp Ile Tyr Ile Lys Ser
 50 55 60
 Ile Glu Asn Glu Ala Phe Ile Lys Leu Ile Gly Glu Ser Tyr Asp Asn
 65 70 75 80
 Gly Ala Val Phe Thr Phe Gln Thr Phe Lys Lys Glu Gly Lys Ile Lys
 85 90 95
 Leu Val Phe Thr Tyr Gln Asn Val Lys Asp Ser Ser Glu Phe Asn Lys
 100 105 110
 Ile Ile Ile Leu Lys Ile Thr Lys Asn Phe Glu Val Ala Ile Pro Gln
 115 120 125
 Gly Val Gly Gly Gly Ser Ser Arg Asp Asn Asn Ile Glu Thr Gly Asn
 130 135 140
 Asn Leu Glu Leu Gly Gly Gly Ser Ile Ser Gly Ala Thr Ser Lys Glu
 145 150 155 160
 Ile Ile Val Arg Ala Leu Asn Leu Ser Tyr Ile Asn Asp Tyr Lys Gly
 165 170 175
 Ala Ile Asp Leu Leu Asn Lys Tyr Asn Phe Asn Asp Asp Lys Tyr Ile
 180 185 190
 Leu Leu Lys Ala Glu Ile His Tyr Lys Asn Gly Asp Tyr Leu Lys Ser
 195 200 205
 Tyr Glu Asn Tyr Leu Lys Leu Lys Ser Lys Tyr Phe Gln Ser Ile Val
 210 215 220
 Phe Asp Leu Ile Arg Leu Ala Ile Glu Leu Asn Ile Lys Glu Glu Val
 225 230 235 240
 Leu Glu Asn Ala Arg Tyr Leu Val Glu Lys Asn Val Asp Phe Ser Glu
 245 250 255
 Ser Ile Tyr Leu Glu Ile Phe Glu Phe Leu Val Thr Arg Gly Glu His
 260 265 270
 Glu Phe Ala Leu Asn Phe Ser Ser Leu Tyr Phe Pro Lys Tyr Ile Asn
 275 280 285
 Ser Ser Phe Ser Asp Lys Tyr Ser Tyr Leu Leu Gly Lys Leu Tyr Glu
 290 295 300
 Ser Glu Ser Lys His Lys Asp Phe Leu Lys Ala Leu His Tyr Tyr Lys
 305 310 315 320

Leu Val Ile Asp Asn Tyr Pro Phe Ser Tyr Tyr Tyr Glu Arg Ala Lys
325 330 335

Ile Arg Tyr Leu Phe Leu Lys Arg Phe Phe
340 345

<210> 140

<211> 15

<212> DNA

<213> *Borrelia burgdorferi*

<400> 140

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